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Editorial Contents for October, 1930

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Mechanical Engineer

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October, 1930

Equipment Painting Section Meets at Chicago

Importance of proper shop equipment for spraying operations emphasized—Mechanical car washing and sandblasting equipment discussed

THE ninth annual meeting of the Equipment Painting Section of the American Railway Association was held at the Congress Hotel, Chicago, on September 9, 10 and 11, 1930. The attendance at this year's convention was somewhat in excess of that of the 1929 meeting—the total being 422 members, guests and supply men. This meeting marked the tenth anniversary of the organization of the former Master Car and Locomotive Painters' Association which was founded at Boston, Mass., in 1870. In addition to the regular reports of the various committees of the Section, during the opening day's session, a paper was presented by John Waterbury, illuminating engineer of the Benjamin Electric Company, Chicago, dealing with the proper methods of illuminating railway paint shops.

The Present Railway Situation

One of the principal addresses during the convention was that of Samuel O. Dunn, editor, Railway Age, at the second day's session. Mr. Dunn, in discussing the effects of the present business depression on railway operation and earnings, said in part:

"The railway situation in this country during the present business depression is widely different from what it was in 1921, the year of our last serious depression, or than it ever was prior to this year. The railways are not only suffering from loss of business due

Officers of the Equipment Painting Section, A.R.A.
Left to right: K. J. Johnson (N. C. & St. L.), first vice-chairman and chairman elect; Marceau Thierry (N. & W.), chairman; E. M. O'Brien (I. C.), second vice-chairman, and V. R. Hawthorne, secretary, Mechanical Division, American Railway Association.

Officers and committee chairmen of the supply association

Left to right: E. B. Van Patten, Glidden Company; M. J. Eble, Louisville Varnish Company; Wm. Horton, Murphy Varnish Company; L. F. Theurer, Pittsburgh Plate Glass Company; E. L. Younger, E. I. duPont de Nemours Company; C. L. Sullivan, Jr., Thresher Varnish Company; J. L. Noon, Glidden Company; S. S. Demarest, Detroit Graphite Company; H. W. Ostrum, Aluminum Company of America; C. A. Otto, Murphy Varnish Company (president); Oscar Haywood, Haywood-Williams Company; C. H. Close, Aquart Manufacturing Company; C. G. Chamberlin, W. H. Coe Manufacturing Company (vice-president), and K. J. Bowers, Acme White Lead & Color Works.

to the present depression but to other influences and conditions to which, in their entire history, they never were subject until within recent years. Owing to these new influences and conditions, railway officers and employees are worrying about whether, after the present depression passes, the railways will have enough traffic. Until recent years railway managers were always concerned about whether they would be able to provide enough facilities to handle future traffic, not about whether they would have enough freight and passenger traffic to handle.

"Owing to large expenditures within recent years upon the improvement and maintenance of railway properties, they were in unprecedentedly good condition when the present depression began. In the hope that the depression would be short, railway managers continued for some months to make liberal capital and maintenance expenditures. The decline in car loadings of freight steadily increased, however, from six per cent in January to 17 per cent in August, and the decline in total earnings became so large that within recent months most railways have adopted policies of sharp retrenchment. This cannot continue long without deterioration of railway service. At the same time, the railways cannot be criticised for retrenching when the decline in their own traffic shows that most industrial and commercial concerns, and the people themselves, are similarly retrenching, and when, unless they effected every possible economy, many railways would not earn the interest on thir bonds.

"The necessity of largely reducing expenses has thrown many employees out of work. The number of railway employees in June was 1,564,269. This was 172,000 less than in June, 1929, and 217,000 less than the average for June during the last five years. This reduction in employees, and the accompanying reduction of railway purchases, are, of course, contributing their share toward preventing a revival of business. The railways cannot contribute much toward a revival of business when their own business is so bad that, in spite of all the economies made, the average percentage of return being earned on their investment is the smallest since 1921.

"While the immediate railway situation is due largely to the business depression, it is also due largely to other causes that were in operation before the depression began. The passenger earnings of the railways this year will be about $525,000,000 less than in 1920, but most of this decline occurred prior to the depression and is due to the competition of motor vehicles on highways. Their freight business increased only one-fourth as much annually during the nine years ending with 1929 as in the preceding 10 years, and this was largely due to the competition of steamships through the Panama canal, inland waterways, and motor trucks. It is the irony of fate that, at the end of a decade in which there has been an enormous decline in railway passenger business, and relatively much the smallest increase in railway freight business that has occurred, in the one hundred years of their history, the government should be carrying out a program of extensive development of inland waterways for the purpose of 'relieving' the railways.

"The railways have today a huge investment, the making of which has provided facilities for handling a much larger traffic, both passenger and freight, than they have ever handled, for handling it more economically per unit of traffic, if they can get enough traffic, and for rendering better service than ever before. Meantime, means of transportation by water and high-

way that are largely subsidized and unregulated by the government are diverting increasing amounts of traffic from them, and it is principally owing to this diversion of traffic that year after year the number of employees of the railways has been declining and that they have been finding it increasingly difficult to approach the 'fair return' which the laws under which they are regulated have assured them.

"The railways heretofore have largely offset the adverse external influences to which they have become so subject within recent years by rapidly increasing the efficiency and economy of their operation. They could effectively meet the competition of all other means of transportation and get enough traffic if other means of transportation were not financially aided by the government, as the railways are not, and were regulated by the government, as the railways are.

"How long will railway employees and the public continue to accept government policies which constantly reduce employment on the railways, which prevent the railways from earning adequate returns in good years and compel such severe retrenchment in poor years, and which, from the standpoint of the public, are without economic justification, because they involve taxing the public to help provide transportation service that is more expensive, including the taxes paid, than service by rail?"

Reports of Committees

The reports of the various committees this year were up to the usual high standard of committee reports of the Equipment Painting Section. These reports cover Shop Construction and Equipment; Tests of Finishing Materials; Maintenance and Care of Paint and Varnish at Terminals; Ornamentation of Cars and Locomotives; Equipment Painting Practices and New Developments in Equipment Painting.

The report of the committee on tests was, as usual, a most comprehensive report commenting in detail on the tests of the many finishing materials which are under consideration at the different shops throughout the United States. The report this year is particularly interesting because of the comments that are made on the exposure tests of lacquer-finished panels. The progress reports of tests on aluminum paint and metal—preservative paints are included in the report and are of interest to those who have considered many of these new materials for service on their individual roads. There was some discussion at a previous meeting concerning the best methods of protecting new galvanized-iron sheets, and this year's report of the test committee comments on this subject with some interesting information as to the best methods for protecting this material in car work.

Lacquer Finishes

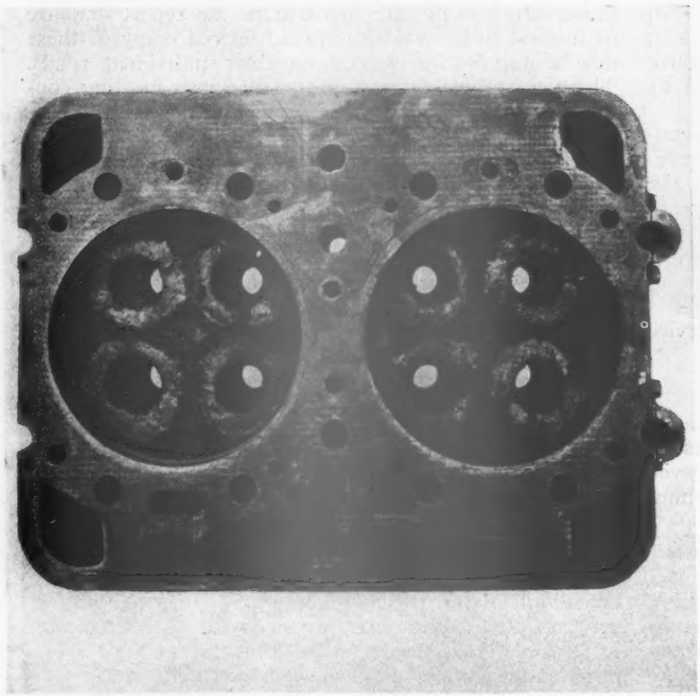
In previous years there has been a great deal of discussion concerning the adaptability of lacquer finishes for railway equipment. This discussion crystallized at last year's meeting in a statement to the effect that lacquer is one of the most desirable finishes that can be applied to passenger-car equipment, both interior and exterior. At this year's meeting there was a certain amount of discussion concerning lacquer—it being ap-

(Continued on page 565)

Officers and members of the Committee of Direction of the Equipment Painting Section, American Railway Association

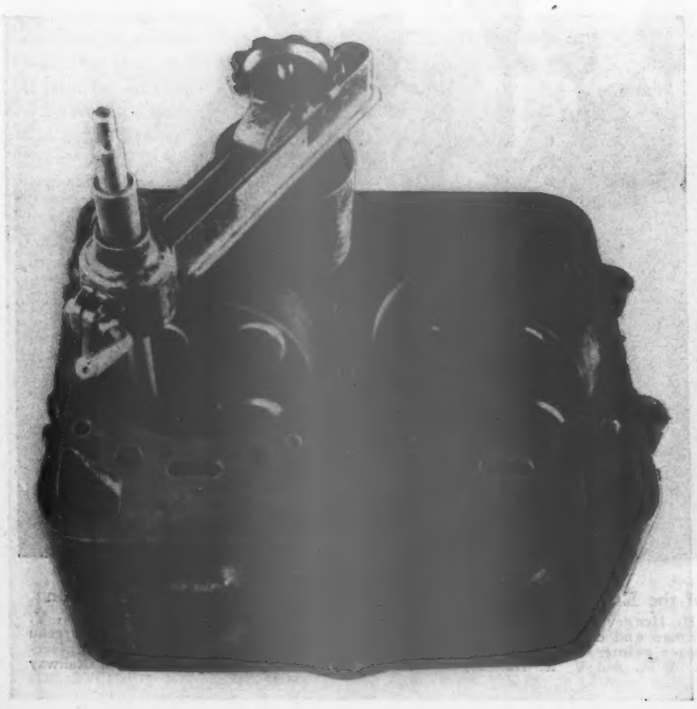
Left to right: E. W. Grimminger, foreman painter, Pennsylvania; H. Hengeveld master painter, A. C. L.; D. C. Sherwood, foreman painter, N. Y. C.; K. J. Johnson, foreman painter, N. C. & St. L. (first vice chairman and chairman elect); A. E. Green, foreman painter, C. & N. W.; Marceau Thierry, foreman painter, N. & W. (chairman); B. E. Miller, master painter, D. L. & W.; E. M. O'Brien, foreman painter, Illinois Central (second vice-chairman); James Gratton, general foreman painter, B. R. & P., and V. R. Hawthorne, secretary, Mechanical Division, American Railway Association.

Tool Foremen's Annual Convention at Chicago



Cylinder-head valve seats rebuilt by welding.

Below—Valve seating and guide reaming tool.



ABOUT 160 members and guests of the American Railway Tool Foremen's Association assembled for their eighteenth annual convention September 10 to 12, inclusive, at the Hotel Sherman, Chicago. Following an address by President A. A. Ferguson, supervisor of tools, Missouri Pacific, St. Louis, Mo., the feature of the opening session was an address by O. A. Garber, chief mechanical officer of the Missouri Pacific, an abstract of which appears below.

Other high points of the convention program included an address on forging machine dies, by H. N. Anderson, Acme Machinery Company, Cleveland, Ohio; an address on heat treatment of steel, by A. H. d'Arcambal, Pratt & Whitney Co., Hartford, Conn., and one on safety first, by H. Guilbert, director of public safety, Pullman Company, Chicago. Committee reports were presented on the following subjects: Tools and Methods for Mass Production, Chairman M. B. Roderick, assistant supervisor of tools and machinery, Erie, Meadville, Pa.; Tools for Maintaining Automotive Equipment, Chairman W. H. Smith, tool foreman, Missouri Pacific, Little Rock, Ark.; Testing Devices for Pneumatic Tools and Jacks, Chairman C. B. Heingarten, tool foreman, Chicago & North Western, Chicago; Standardization, Chairman E. J. McKernan, supervisor of tools, Santa Fe, Topeka, Kan.

During the final session of the conven-

Partial group of officers and Executive Committee members of the American Railway Tool Foremen's Association

Seated (left to right): Secretary-treasurer, G. G. Macina, C. M. St. P. & P.; president-elect, H. L. Taylor, supervisor of shop machinery and tools, B. & O.; retiring president, A. A. Ferguson, supervisor of tools, Mo. Pac.—Standing (left to right): B. B. Loveland, tool foreman, N. & W.; third vice-president, M. B. Roderick, assistant supervisor of tools and machinery, Erie; second vice-president, D. L. Grady, tool foreman, A. C. L.; Executive Committee chairman, J. E. Carroll, supervisor of tools, C. & O.; E. S. Behen, machine foreman, M-K-T.; H. W. Smith, tool foreman, Mo. Pac.

tion, the following officers of the American Railway Tool Foremen's Association were elected for the ensuing year: President, H. L. Taylor, supervisor of shop machinery and tools, Baltimore & Ohio, Baltimore, Md.; first vice-president, J. T. Jones, tool foreman, New York Central, Cleveland, Ohio; second vice-president, D. L. Grady, tool foreman, Atlantic Coast Line, Rocky Mount, N. C.; third vice-president, M. B. Roderick, assistant supervisor of tools and machinery, Erie, Meadville, Pa.; secretary-treasurer, G. G. Macina, Chicago, Milwaukee, St. Paul & Pacific, Chicago. The executive committee members, including three newly-elected, are J. E. Carroll, supervisor of tools Chesapeake & Ohio, Huntington, W. Va., chairman; L. C. Bowes, general piecework supervisor, Rock Island, Chicago; W. H. Smith, tool foreman, Missouri Pacific, Little Rock, Ark.; E. S. Behen, machine foreman, Missouri-Kansas-Texas, Sedalia, Mo.; B. B. Loveland, tool foreman, Norfolk & Western, Roanoke, Va.

The Tool Foremen's Supply Association elected the following officers to take charge of its activities during the coming year: President, H. W. Leighton, Harry W. Leighton Company, Chicago, and secretary-treasurer, E. E. Caswell, Union Twist Drill Company, Chicago. The members of the executive committee are: H. W. Leighton, Harry W. Leighton Company, Chicago, chairman; C. C. Ziegler, Greenfield Tap & Die Corporation, Chicago; G. F. Gobel, Morton Manufacturing Company, Muskegon, Mich.; F. H. Revell, King Pneumatic Tool Company, Chicago; W. R. Mau, Vanadium Alloy Steel Company, Chicago; W. F. Bretschneider, Norton Company, St. Louis, Mo.; H. J. Trueblood, Arrow Tools, Inc., Chicago; B. O. Swanson, Wedge Lock Tool Company, Chicago; H. J. Blum, Armstrong-Blum Manufacturing Company, Chicago, and L. G. Groessl, Foster Johnson Reamer Company, Elkhart, Ind.

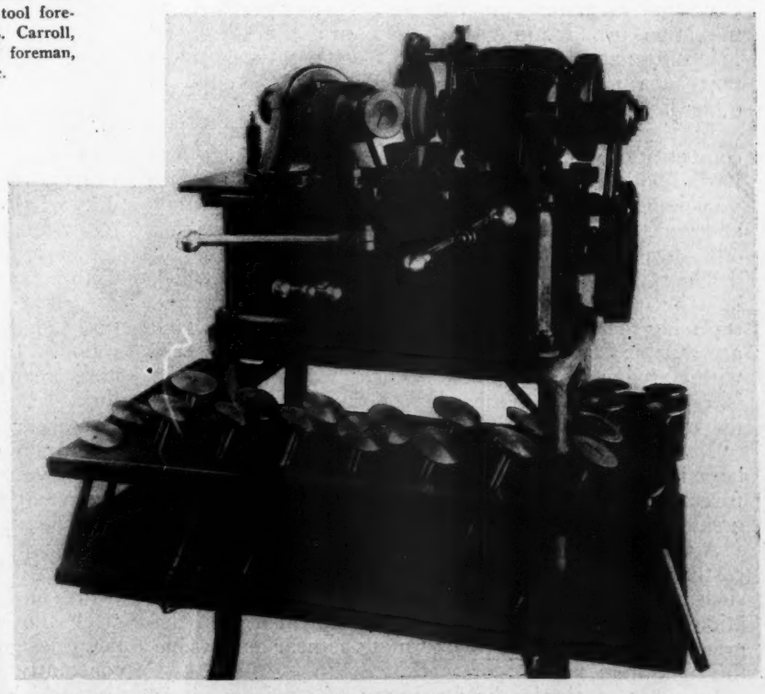
Tool Foremen and Shop Efficiency

By O. A. Garber

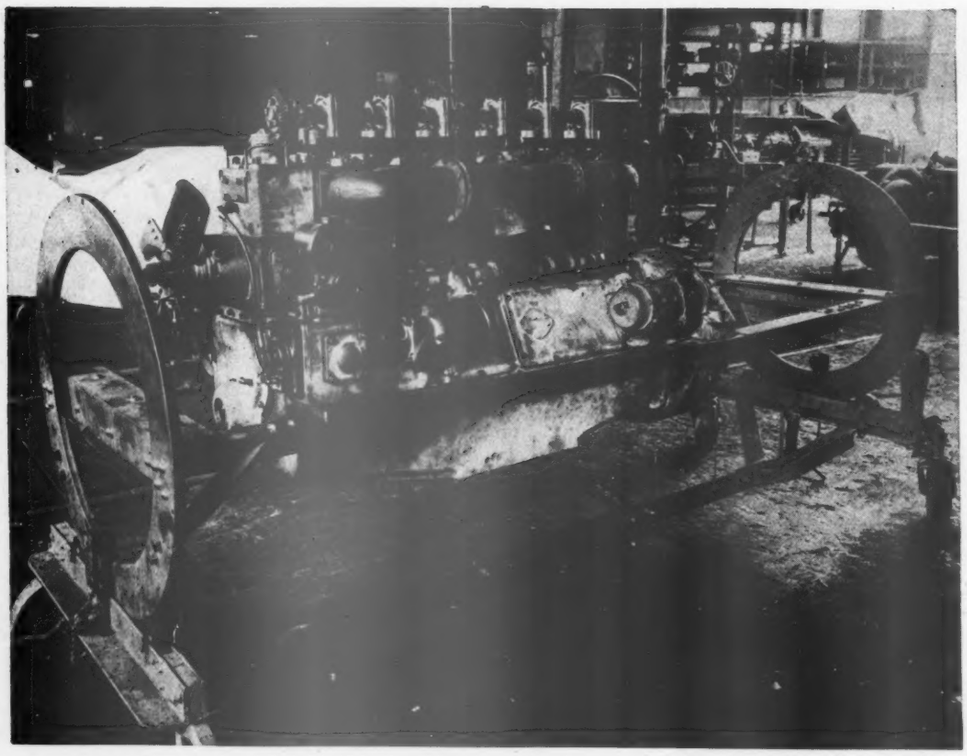
Chief mechanical officer, Missouri Pacific, St. Louis, Mo.

I am a firm believer in a group of men interested in the same line of endeavor getting together once in a while and discussing the problems which they have encountered and the methods used to overcome them. Such discussions are of mutual benefit.

In this age of efficiency and production, the problems of the tool supervisors and foremen have been multiplied



Valve-refacing grinding tool and valve stand



Revolving engine rebuilding stand

a hundred-fold, for every day produces new machines and equipment for more efficiently and more economically handling work and material, and if the man in direct charge of the tool equipment is not abreast with this progressive movement, he is now left far in the rear of the procession.

In this day of production machinery and methods, it is imperative that he keep posted by reading, correspondence, attending such meetings as this. The automobile industry is given the credit for the great development in machine tool design along methods of maximum production with a minimum expenditure, and it is only natural in these days of competitive business that such methods should gradually be extended to other lines.

In the days of light power and equipment when competition was not so keen and labor was cheap and parts readily handled by hand, the cost was not of such vital importance in a railroad shop. Further, operation and parts had not been sufficiently standardized so that our so-called production methods could be applied.

The railroads are discarding obsolete machines, which have been in service fifteen, twenty or thirty years, and replacing them with more modern machine tools, which are capable of doing from 25 to 50 per cent more work with a reduction in manual labor. While the output is greatly increased, the physical labor expended by the operator is greatly decreased.

New machines bring new problems of tooling and here is where the ingenuity and resources of the tool foremen are taxed to the utmost in order to derive the greatest benefit possible from such modern machinery.

Again, the modern heavy duty machinery is very costly and in order to realize fully on the investment, such machines should be tooled up for as many operations as possible in order to keep them in motion the greatest amount of time, performing as near as possible the maximum amount of work.

In order to obtain the maximum of efficiency, it is necessary that machined parts of equipment be standardized so there will be interchangeability of such parts. This will permit the stocking of finished parts, and they can be machined in quantities instead of one piece at a time, as in days gone or going by. This calls for special fixtures and jigs for handling the greatest number of parts in the least possible time. It is essential that these jigs and fixtures be made to the closest practical tolerances so that there will be absolute interchangeability of parts. In nearly all instances it is the duty of the tool foreman either to design outright or assist in the designing of such accurate fixtures, and in practically all instances, they are manufactured under his direct supervision. Instead of discussing measurements in sixteenths or thirty-seconds of an inch, we now hear them mentioned in plus or minus ten-thousandths.

I have confined my preceding remarks largely to the advancement made in machine tools, but the same advancement is being made along the entire line of hand tools, new steel alloys, closer tolerances, new designs, etc., which are constantly being brought out and which produce more ac-

Bearing shells, camshaft - bearing babbitting jig and cutter for facing rod bearings and caps.

curate and efficient output. A live tool foreman will keep in touch as far as possible with the new developments in his line, and one of the best methods of doing so is by attending and participating in such gatherings as this.

Tools for Maintaining Automotive Equipment

During the past several years a great many of the railroads have gradually replaced their steam operated trains on branch lines with gas-electric motor cars with the view of effecting economy and offering better transportation and service. Due to the constant increase in the use of this type of equipment the development of facilities and organizations for their maintenance has been necessary with the result that tools, devices and methods for performing the operations required had to be developed so that such operations could be performed by the mechanical department in an efficient and economical manner.

This subject offers to our association a new and wide field in the development of tools and devices and in order that this report would cover the items of greatest importance the support of the various railway supervisors of motor cars was solicited and their reports have been consolidated herewith.

In this report it is our endeavor to cover this class of work as it pertains to the railroad shop. Practically all of the railroads have sufficient numbers of motor cars (gas, electric and oil), motor busses, tractors, caterpillars, lift trucks and shop electromobiles to warrant a separate shop for the maintenance of these types of equipment.

This building should be well lighted and have good ventilation which is necessary as the motor fumes are very dangerous unless a constant flow of fresh air into the enclosure is maintained at all times. Pits should be constructed for truck work. Jib cranes will be found to be an advantage in moving heavy motor blocks and parts. Portable hoists of the A-frame type mounted on casters will expedite the removing of motor blocks from frame chassis.

A sufficient number of steel work benches with mounted vises should be given consideration in the shop layout as the greater part of the work to be done is assembling parts. A cleaning system is required for the parts so that a safe inspection can be made of parts removed for repair or inspection. For a fast moving inventoried stock of parts and tools we would suggest that a crib type of storeroom be installed inside of the building with a space for tool checking.

In presenting our list of standard machine tools to be installed it is assumed that the shop for maintenance will be adjacent to the locomotive machine shop which is equipped with machine tools of sufficient size so as to perform such operations as armature turning, crankshaft grinding and other occasional operations requiring the use of a large machine tool.

Tool Equipment Required

Tools which we feel are required for the efficient operation of this shop are listed herewith:

A line boring bar, machine-or-hand-operated, equipped with constants for various sized shafts, chamfering or radius attachment and tapered lining up spools for the aligning and sizing of main crank bearing.

Connecting-rod borer with distance plug adjustable for size and length.

One 16-in. lathe with 6-ft. bed, equipped with taper attachment, collets, mandrel to fit skirt for rough turning pistons, angle grinder for finishing pistons and independent four-jaw chuck.

Electric-driven grinder for valves, tappets and push rods.

One 36-in. radial drill, speed range 100 to 1,500 r.p.m., 1½-in. drill capacity for general drilling and reaming.

Pedestal grinder using 2-in. by 12-in. wheels for hand grinding.

Bench grinder using ½-in. by 8-in. wheels and wire brush.

Cast-iron face plates, 24-in. by 24-in. and 48-in. by 24-in.

Two—24-in. crank shapers.

Bench arbor press, rack and pinion type.

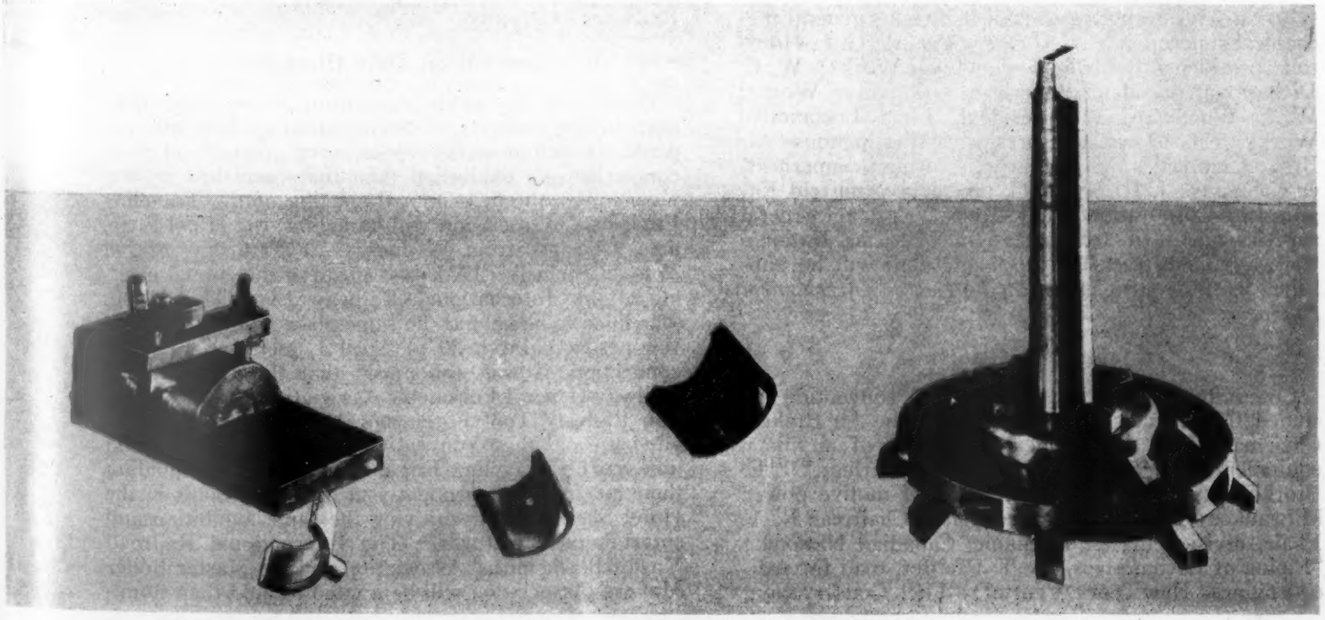
One 25-ton hydraulic press for gears, shafts and bushings, and wheels.

Furnace for melting bearing metals.

Electric drill: (one) ¼-in. capacity; (one) ¾-in. capacity, for portable drilling, reaming and honing machines.

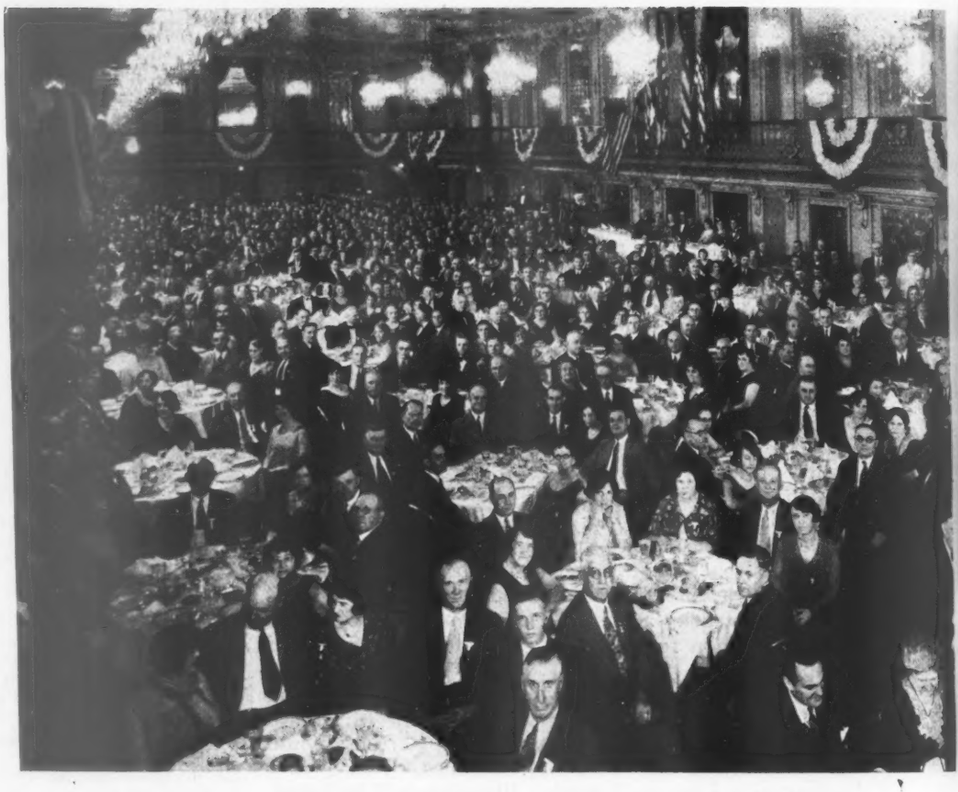
Adjusting hones for tractor blocks, to be used for straightening slightly tapered or out-of-round cylinders.

(Concluded on page 568)



Traveling Engineers Hold C

THE annual meeting of the Traveling Engineers' Association, held at the Hotel Sherman, Chicago, September, 23 to 26, inclusive, was one of the most interesting and instructive held in recent years and, contrary to expectations, the attendance surpassed that of 1929. The Official registration was 688 railroad men, 470 supply men and 359 ladies, or a total of 1,517, as compared to 508 railroad men, 481 supply men and 411 ladies, or a total of 1,400 in 1929. Practically all of the regular business sessions were presided over by President Ralph Hammond, road foreman of engines, New York, New Haven & Hartford, Providence, R. I.



Unquestionably, the feature of the convention was the day's discussion devoted to the subject, "Motive Power of Tomorrow." Prominent railway and supply executives who took part in this discussion, presided over by Samuel O. Dunn, editor, Railway Age, included T. W. Demarest, general superintendent of motive power, Pennsylvania—Western Region; Silas Zwight, general mechanical superintendent, Northern Pacific; G. L. Houston, president, Baldwin Locomotive Works; W. C. Dickerman, president, American Locomotive Works; W. E. Woodward, vice-president, Lima Locomotive Works; S. G. Down, vice-president, Westinghouse Air Brake Company; G. L. Bourne, chairman, Superheater Company; J. E. Muhlfeld, president Muhlfeld Engineering Corporation; M. J. Macias, assistant general superintendent of transportation, Mexican National Railways. Abstracts of the symposium will be published in subsequent issues of the *Railway Mechanical Engineer*.

Committee Reports

Committee reports presented at the convention included "Maintenance and Operation of the Air Brake," Chairman G. E. Terwilliger, supervisor of auxiliary equipment, New Haven; "Frictionless Bearings," J. E. Bjorkholm, assistant superintendent of motive power Milwaukee; "Long Locomotive Runs," Chairman R. A. Phair, division master mechanic, Canadian National; "Piping of Locomotives," A. T. Pfeiffer, road foreman of engines, New York Central; "Fuel Conservation, Both Coal and Oil," Chairman M. J. Macias, assistant general superintendent of transportation, National Railways of Mexico.

Convention Date Changed

On the last day of the convention, it was announced that, in the interests of conservation of time and expense, as well as to provide an even greater and more comprehensive exhibition than that furnished in previous years, the next annual meeting of the Traveling Engineers' Association will be held at the Hotel Sherman, Chicago, from Wednesday to Saturday, March 25 to 28, inclusive, 1931, just ahead of the annual meeting of the International Railway Fuel Association, scheduled to be held at the same place from Monday to Wednesday, March 30 to April 1, inclusive. In this connection, it was announced that the International Railway General Foremen's Association and the American Railway Tool Foremen's Association will be invited to hold their conventions at the same place and time as the Traveling Engineers' Association, holding their meetings independently in different rooms in the Hotel Sherman, but enjoying the same exhibition and entertainment features. The International Railroad Master Blacksmiths' Association and the Master Boiler Makers' Association will be invited to hold their annu-

d Constructive Convention

The annual dinner of the Traveling Engineers Association

al meetings under similar arrangements with the International Railway Fuel Association during the first week in April of each year.

Election of Officers

The following officers were elected to preside over the activities of the Traveling Engineers' Association during the coming year: President, R. A. Phair, division master mechanic, Canadian National, Montreal; first vice-president, H. B. Kelly, general road foreman of engines, Pittsburgh & Lake Erie, McKees Rocks, Pa.; second vice-president, J. M. Nicholson, fuel conservation engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.; third vice-president, A. T. Pfeiffer, road foreman of engines, New York Central, Syracuse, N. Y.; fourth vice-president, D. L. Forsythe, general road foreman of engines, St. Louis-San Francisco, Springfield, Ill.; fifth vice-president, D. I. Bergin, assistant general road foreman of engines and fuel supervisor, Wabash, Decatur, Ill. David Meadows, master mechanic, Michigan Central, St. Thomas, Ont., was re-elected treasurer and W. O. Thompson, equipment assistant, New York Central, Buffalo, N. Y., remains as secretary. Two new members were elected to the executive committee, which now comprises: F. P. Roesch, sales manager, Standard Stoker Company, Chicago; B. J. Feeney, traveling engineer, Illinois Central, Chicago; E. R. Boa, road foreman of engines, New York Central, Buffalo, N. Y.; G. A. Kell, safety engineer, Canadian National, Montreal, Que.; J. C. Simino, traveling engineer, Southern Pacific, Lafayette, La.; M. A. Daly, master mechanic, Northern Pacific, Pasco, Wash.; G. C. Jones, master mechanic, Atlantic Coast Line, Jacksonville, Fla.; C. I. Evans, chief fuel supervisor, Missouri-Kansas-Texas, Parsons, Kan.; A. White, general road foreman of engines, Southern, Charlotte, N. C.; J. N. Clark, Southern Pacific, San Francisco, Cal.; J. P. Stewart, general supervisor of air brakes, Missouri Pacific, St. Louis, Mo.; J. B. Hurley, general road foreman of engines and fuel supervisor, Wabash, Decatur, Ill.; J. D. Clark, fuel supervisor, Chesapeake & Ohio, Richmond, Va.; M. J. Macias, assistant general superintendent of transportation, National Railways of Mexico, Mexico City, Mex.; J. J. Kane, road foreman of engines, Lehigh Valley, Sayre, Pa.; G. A. Haslett, general road foreman of engines, Seaboard Air Line, Tampa, Fla.; Ralph Hammond (retiring president), road foreman of engines, New

Ralph Hammond

President, Traveling Engineers Association

C. M. Hoffman

President, Railway Equipment Manufacturer's Association

York, New Haven & Hartford, Providence, R. I.; J. C. Lewis, road foreman of engines, Richmond, Fredericksburg & Potomac, Richmond, Va.; D. J. Ayers, supervisor of locomotive performance, Boston & Maine, Boston, Mass.

Exhibition of Equipment and Supplies

The exhibition of railway equipment and supplies, provided in connection with the convention, was both comprehensive and informative, being well up to previous standards in this respect. A total of 125 supply companies was represented, or only one less than in 1929. The Railway Equipment Manufacturers' Association, which sponsored this exhibit under the direction of President C. M. Hoffman, Dearborn Chemical Company, Chicago, and Secretary-Treasurer F. W. Venton, Crane Company, Chicago, elected the following officers for the ensuing year: President, L. B. Rhodes, Vapor Car Heating Company, Washington, D. C.; first vice-president, Richard Welsh, Nathan Manufacturing Company, Chicago; second vice-president, C. F. Weil, American Brake Shoe & Foundry Co., Chicago; secretary-treasurer, F. W. Venton, Crane Company, Chicago. The Executive Committee comprises M. K. Tate, Lima Locomotive Works, Lima, Ohio; R. R. Wells, Hunt-Spiller Manufacturing Corporation, South Boston, Mass.; E. H. Weaver, Westinghouse Air Brake Company, Chicago; R. T. Peabody, Air Reduction Sales Company, New York; Thomas O'Leary, Jr., Johns-Manville Sales Corp., Chicago; Bradley Johnson, W. H. Miner, Inc., Chicago.

Long Locomotive Runs

When your committee undertook to secure available information from roads which had adopted the practice of running locomotives over two or more divisions, questionnaires were prepared and distributed to 25 of the leading railroads. These questionnaires were answered by 18 railways and the following paper is a summary of results secured by these railroads and no doubt represents results which were obtained by the railways which did not reply or did not have available data which could be placed in figures.

While the practice of running engines over two or more divisions is new on some roads, nevertheless many roads have adopted this practice for quite a number of years. This is evidenced in referring to a paper under this heading discussed at the convention in 1923, but the figures available in that paper compared with the figures under present practice show a substantial increase in long distance runs. In the summary presented in the paper in 1923, the mileage of individual runs on five outstanding roads gave an average of 346 miles, while a summary of five outstanding roads for 1929 shows an average of 746 miles. These figures were taken from roads running suoth, west, east and north, and consequently should be fairly representative of runs at the present time. The runs specially referred to in arriving at these figures are shown in the table. These figures are quoted to show the advancement which has been made in extending locomotive runs during the past six years.

Advantages and Economies in Longer Runs

One economy resulting from longer runs would be increased mileage per locomotive over a period of time, which results in increased utilization of power units. Assuming the cost of general repairs as an investment of $10,000.00 to $12,000.00 this investment places the individual unit in condition to produce 150,000 miles. By making this unit produce the 150,000 miles in 18 months instead of 24 months, the earnings on the $12,000.00 investment have been increased approximately 33⅓ per cent. In other words, a quicker turnover is realized on the money invested in making repairs.

Decreased Number of Locomotives

Another large item of economy is the decreased number of locomotives necessary to perform a given service. Reports from the questionnaire indicate that this decrease in number of units extends from 30 to as high as 100 per cent. The average on a number of roads shows an economy of 40 per cent. The effect of this is felt in the decreased purchase of new power. One road reports in high-class passenger service 17 locomotives doing the work formerly done by 29. Another road shows 64 engines doing the work formerly done by 93; this also in heavy passenger service. Trunk lines out of Chicago report 69 engines doing the work formerly done by 110 engines, saving 40 engines, the interest charge savings alone amounting to $14,000.00 monthly.

Long Locomotive Runs in Passenger Service

	Miles
New York Central—Harmon to Chicago	922
Canadian National—Winnipeg to Edmonton	801
Southern Pacific—El Paso to Los Angeles	888
Canadian National—Sarnia to Montreal	507
Illinois Central—Chicago to New Orleans	922
New York Central—Albany to Chicago	814

Making Longer Runs Successfully

In connection with extending the runs of locomotives, consideration should be given the matter of complete inspection and upkeep of repairs. Greasing of driving boxes, side rod pins, engine trucks and motion work are important factors in the success of long distance runs. On trains operating on fast schedules it is necessary to give grease cups attention at intermediate terminals. Engines on slower schedule may safely make a run of 300 miles without refilling of cups. In order to avoid delays through shoveling coal ahead at intermediate division points, the erection of coal shutes on or convenient to main tracks or the equipping of engines with coal pushers is a necessity. The committee finds that little trouble is experienced due to the fires except where a poor grade of coal is used. It is safe to presume that to make a long run successfully, a fair grade of coal is necessary. The co-operation of enginemen and firemen is essential and it is best secured through an educational program with regard to the inspection and oiling of locomotives. Best results are also secured through assigning regular engines to certain runs, and emphasis should be placed on the desirability of keeping the engines on the assigned runs. On account of the increased oil capacity and no need of adjustment of the lubricator by engine crews enroute, it is felt that the mechanical lubricator is a desirable adjunct to locomotives on long runs. Where the hydrostatic lubricators are used, there is a tendency for the enginemen on the first division to be too liberal in the supply of oil, causing a shortage before the end of the run.

An important item in the education of enginemen, is that enginemen should report personally to relieving enginemen any condition observed during the operation on the run; this in order that no item might be overlooked by the engineman in making his report at the final terminal. It is also essential that a thorough inspection should be made immediately on arrival of the engine at the final terminal. This should cover condi-

(*Continued on page 572*)

General Foremen Hold Twenty-fifth Anniversary Convention

Members listen to four addresses and six committee reports—Attendance relatively small compared to last year

ON the silver anniversary of its founding, the International Railway General Foremen's Association met in regular convention at the Hotel Sherman, Chicago, September 16 to 19, inclusive. The total registration was 365, of whom 166 were railroad men, 131 supply men and 68 ladies. President H. B. Sunderman, general foreman, Chesapeake & Ohio, Columbus, Ohio, traced briefly the origin and development of the association, outlining its objectives in fostering increased shop efficiency and improved railway service. Speaking for J. A. Anderson, assistant superintendent of motive power of the Chicago, Milwaukee, St. Paul & Pacific, who was unable to be present, C. L. Emerson, master mechanic at Chicago, welcomed the delegates and pointed out how they could profit by actively participating in the meetings and, in particular, familiarizing themselves with the exhibits.

In a stirring address, L. Richardson, chief mechanical officer, Boston & Maine, appealed to the general foremen and other members of the association not to overlook the opportunities for improvement and economies which surround them all. He said that the whip of keen competition will compel the railroads to drive forward in the next 20 years as never before and that railroad progress during that period will no doubt exceed the progress of the past 20 years.

H. C. Stevens, general storekeeper, Wabash, discussed the cost of material delays, outlining a workable plan whereby existing data regarding the use of material may be employed to avoid shop delays.

E. Von Bergen, general air brake lubricating and car heating engineer, Illinois Central, addressed the convention, emphasizing numerous ways in which the general foremen have in the past contributed to the improvement in locomotive performance and railway operation. He stressed the necessity of providing and maintaining proper heating and lighting facilities in passenger equipment with a view to rendering the best service to the public.

Committee reports presented during the course of the convention included: "Engine Truck Maintenance and Lubrication", A. T. Streeper, general foreman,

Officers of the International Railway General Foremen's Association

Seated left to right: Secretary-treasurer, William Hall; retiring president, H. B. Sunderman, C. & O. Standing left to right: First vice-president, C. M. Hillman, M. & St. L.; second vice-president, W. J. McClosky, I. C.; executive committee member, F. M. A'Hearn, B. & L. E.; president-elect, A. H. Keys, B. & O.; first vice-president, A. T. Streeper, N. Y. C. & S. L.

Nickel Plate, Conneaut, Ohio, chairman; "Cost of Material Delays to Locomotives and Cars", F. M. A'Hearn, assistant general foreman, Bessemer & Lake Erie, Greenville, Pa., chairman; "Stabilization of Mechanical Shop Forces," F. E. Baker, master mechanic, Bangor & Aroostook, Oakfield, Me., chairman; "Inspection, Maintenance and Repairs to Gas-Electric Rail Cars," W. H. Longwell, general foreman, Baltimore & Ohio, Gassaway, W. Va., chairman; "The General Foreman's Contribution to Fuel Economy," C. M. Hillman, shop superintendent, Minneapolis & St. Louis, Marshalltown, Iowa, chairman; and "Better Maintenance of Passenger-Car Equipment," W. J. McCloskey, general car foreman, Illinois Central, Centralia, Ill., chairman.

Election of Officers—Exhibition

At the closing session, the following officers were elected for the ensuing year: President, A. H. Keys, general car foreman, Baltimore & Ohio, Pittsburgh, Pa.; first vice-president, A. T. Streeper, general foreman, Nickel Plate, Conneaut, Ohio; second vice-president, W. J. McCloskey, general car foreman, Illinois Central, Centralia, Ill.; third vice-president, C. M. Hillman, shop superintendent, Minneapolis & St. Louis, Marshalltown, Iowa; fourth vice-president, Martin A. R. Slack, general foreman, New York, New Haven & Hartford, New York; secretary-treasurer, William Hall, Winona, Minn. The executive committee includes H. B. Sunderman, general foreman, Chesapeake & Ohio, Columbus, Ohio, chairman; J. H. Armstrong, general foreman, Atchison, Topeka & Santa Fe, Topeka, Kan.; F. M. A'Hearn, assistant general foreman, Bessemer & Lake Erie, Greenville, Pa.; C. A. Barnes, general foreman, Belt Railway of Chicago, Chicago, and E. J. Burck, superintendent of shops, Michigan Central, Jackson, Mich.

Forty-eight companies selling railway equipment and supplies were represented in the exhibition held in conjunction with the convention. These companies are organized in a body known as the Association of Railway Supply Men, which elected the following officers for the year 1930-31: President, J. W. Fogg, MacLean-Fogg Lock Nut Company, Chicago; secretary-treasurer, J. F. Gettrust, Ashton Valve Company, Chicago; executive committee members: E. H. Weaver, Westinghouse Air Brake Company, Chicago, chairman; Fred Ehredt, (one year) Nathan Manufacturing Company, Chicago; R. Q. Milnes, (two years) Dearborn Chemical Company, Chicago; P. J. Conrath, (three years) National Tube Company, Chicago; J. F. Raps, (three years) Okadee Company, Chicago.

Better Maintenance of Passenger Cars

To save time and to shorten this important paper all possible, your committee directed a series of questions to a large number of railroads throughout the United States and Canada. These questions and a resumé of the answers follow.

What is your time limit on cleaning and testing passenger-car air brakes? Replies received show that there is no standard practice throughout the country on this matter. Several railroads answering state that they clean the cylinder every twelve months and the triple valve every three months; others state that they clean the cylinder every six months and the valve every three months. In some cases this applied to UC equipment and in others to LN equipment.

Examination of journal brass? A great percentage of railroads answering this question state that they examine all passenger brasses every 90 days by jacking up the car, removing the brass, examining the wedge, thoroughly shaking the packing and, where found serviceable, returning it to the box and renewing the packing at the end of six months, the next inspection. Some railroads on their feature trains make this examination every thirty days.

How many hot boxes do you have per million miles in passenger-car service? This was answered by the several railroads by stating that some had run up to several million miles per hot box, while others reported one hundred thousand miles per hot box, and it is to be noted that where the boxes were examined only every six months, those railroads did not have as good a record as where this work was done every 90 days.

What materials do you use in repairs or in the construction of new cars for the separation of metals? Roads replying were predominant in the use of red lead. Others use trade materials for this purpose. However, the red lead was predominant except in the separation of the metal from wood parts. In these cases well known manufacturers' products were used extensively.

What method do you use to prevent moisture between the wood and steel floors of cars, this applying especially to dining cars, express and baggage cars? The roads replying state that this is handled in various different ways and by various kinds of materials, but the consensus of opinion of those replying was that a good drainage system should be provided first, and water-resisting materials used to cover cork and other fillers.

How often do you inspect draft gears? All the roads to whom inquiries were sent demonstrate by their replies that there is no standard accepted but their own in the handling of this matter. Some roads examine them every six months, some every trip and some have no set time.

What lines of demarcation do you use in marking out gears removed so that failed gears will not be returned to the car? Some roads report that when one inch slack has developed, other roads replying that when one-half inch slack has developed and others confine this to one-fourth inch slack, others state there is no set practice.

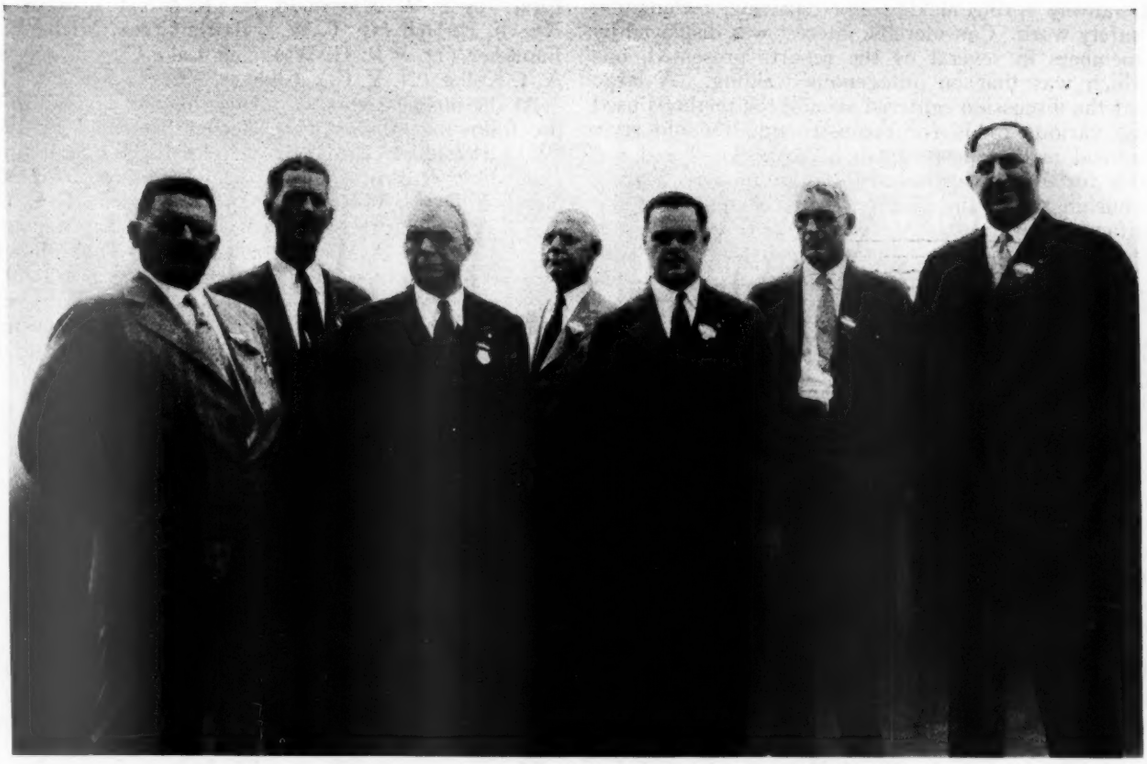
What method is used at terminals to stop noise from loose pipes? On the majority of roads pipe fitters try out each pipe and are also governed by a report furnished by the train conductor and other train-service men who furnish a form that is delivered or mailed to the point where the car lays over.

What methods, if any, are used to cushion the coaches from noises and squeaks developed by the momentum of the train? Some roads reporting state nothing except springs, others use rubber at certain points such as center plates and side bearings, and other roads report they are making a study of complete rubberization of their trucks but have not yet completed their investigation along these lines. One of the important features that was brought out by many of the roads to stop noises was the proper adjustment of the diaphragm.

How long do you permit cars to run between shoppings? The general replies show that the average is two years for mail and baggage cars, one year for diners and two years for day coaches.

Is the mechanical condition of the car or the condition of the paint the governing factor in placing the car in shop? Some roads replying state that paint is the

(*Continued on page 570*)



Officers and Executive Committee Members of the International Railroad Master Blacksmiths' Association for 1930: (Left to right) W. J. Mayer (M. C.); J. J. Eagan (N. Y., N. H. & H.); J. P. Reid (M. P.); W. W. Shackford (A. C. L.); W. J. Wiggin (B. & M.); Joseph Grine (N. Y. C.); R. F. Scott (Reading).

Blacksmiths' Association Meets at Chicago

THE thirty-fourth annual convention of the International Railroad Master Blacksmiths' Association was held at the Hotel Morrison, Chicago, September 23, 24 and 25. The meeting this year was held at a later date than usual in order to afford the members of the Blacksmiths' Association an opportunity to visit the exhibit of the National Metals' Congress, being held by the American Society for Steel Treating at the Hotel Stevens, Chicago. At the opening session of the convention, there was a brief address by Robert E. Guthrie, president of the American Society for Steel Treating, extending a special invitation to the members of the Blacksmiths' Association to attend the exposition and any of the technical sessions of the Steel Treaters' Society. There was also a brief address by R. H. Turnbull, assistant superintendent of motive power, Atlantic Coast Line, who expressed satisfaction that it was possible for the association to meet at this particular time in order that the members might take advantage of the meetings with other organizations that were being held in Chicago during that week. Mr. Turnbull pointed out that materials and methods are changing so rapidly in railway work that it is necessary for one to keep abreast of the times by constant contact with fellow craftsmen.

During the three-day session, there were several reports presented to the convention on the subjects of autogenous welding, machine forging, heat treatment of

Officers of the Master Blacksmith's Supply Men's Association

(Left to right) President, E. T. Jackman, Firth-Sterling Steel Company; Vice-President, W. A. Champieux, Oxweld Railroad Service Company; Secretary-Treasurer, J. H. Jones, Crucible Steel Company of America.

steel, railway spring making and repairing, reclamation and safety work. Considerable interest was displayed by the members in several of the reports presented, one of which was that on autogenous welding. A large part of the discussion centered around the methods used by the various roads for reconstructing the old style forked-end main rods so as to make a closed end rod suitable for the application of the more modern floating type bushings. In the discussion of the report on the manufacture and repair of springs, there was a great deal of discussion concerning the report presented by W. J. Wiggin, Boston & Maine, which was a detailed description of the equipment and methods used in the new spring plant installed at the North Billerica shops of the Boston & Maine a little over a year ago. Much of the discussions of the report centered around the economy of operation in modern spring plants and involved many questions concerning detailed costs. There was also considerable discussion in connection with the report on springs which indicated that there is a wide diversity of opinion as to the best material for railway springs—straight carbon steel or alloy steel. The discussion indicated that the attending membership of the association was about equally divided on this question, but it was brought out that in spring plants using alloy steel, the installation of modern furnace and temperature-control equipment is an absolute necessity.

The following committee reports were presented and discussed: "Autogenous Welding", by M. Blum (C. & A.), Chicago, G. W. Grady (C. & N. W.), Chicago, R. L. Woodrum (C. & O.), Clifton Forge, Va.; "Carbon and High Speed Steel and Heat Treatment", by J. W. Riley (L. V.), Sayre, Pa., L. R. Spicer (C. & O.) Columbus, Ohio, C. Knapp (M. P.), Sedalia, Mo., and P. Lavender (N. & W.), Ronoke, Va.; "Drop and Machine Forging and Tools and Formers", by F. F. Hayes (I. C.), Paducah, Ky., W. W. Shackford (A. C. L.), Waycross, Ga., S. Lewis (C. N.), Winnipeg, Can., and A. L. Lyons (M.-K.-T.), Parsons, Kan.; "Spring Making and Repairing," by W. J. Wiggin (B. & M.), North Billerica, Mass., J. B. Ray (M. P.), North Little Rock, Ark., F. Reinhart (L. & N.), Louisville, Ky., and T. F. Buckley (D. L. & W.), Scranton, Pa.; "Reclamation," by E. Hall (T. & P.), Marshall, Tex., G. Robbinett (M.-K.-T.), Parsons, Kan., and W. Constance (C. & O.), Barboursville, W. Va.; "Safety First," by T. W. Merrifield, Jr. (K. & I. T.), Louisville, Ky., F. B. Dell (G. T. W.), Battle Creek, Mich., L. G. Faulkner (D. & R. G. W.), Salt Lake City, Utah., and A. J. Kollat (N. Y. C.), Elkhart, Ind.

At the business session during the last day's meeting, the following officers were elected for the year 1930-1931: President, R. F. Scott, (Reading), Shillington, Pa.; first vice-president, W. J. Wiggin (B. & M.), North Billerica, Mass.; second vice-president, F. B. Dell (G. T. W.), Battle Creek, Mich.; secretary-treasurer, W. J. Mayer (M. C.), Detroit, Mich. The following members were appointed by the incoming president to serve on the executive committee for the ensuing year: J. J. Eagan (N. Y., N. H. & H.), New Haven, Conn.; W. W. Shackford (A. C. L.), Waycross, Ga.; and Joseph Grine (N. Y. C.), Buffalo, N. Y.

Drop Forging

By W. W. Shackford

Atlantic Coast Line, Waycross, Ga.

There are so many factors that tend either to success or failure in drop forging operations that I hesitate to prepare a paper on the subject, especially where my paper will reach only railroad blacksmith foremen. The subject is so broad that I have decided in this paper to refer only to the main factors in the art and only those that will make for success.

The drop hammer itself, while of main importance, is not the only factor necessary for the economical production of drop forgings. A trimming press is a necessary adjunct and should be provided in all cases if the forgings are to be made in quantities that will warrant the making of dies for the hammer. A die sinking machine is also necessary and here the size of this machine should be carefully considered in relation to the largest sizes of dies to be used.

Drop forging is a comparatively new art and there are not many railroad shops at this time equipped for this class of forging. Drop forgings can be manufactured economically or costly, depending upon many factors in their production.

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A portion of the interior of the enlarged machine shop at the Portsmouth, Ohio, shops of the Norfolk & Western

Car Men Rename Organization "Car Department Officers' Association"

At the annual fall convention of the Master Car Builders' and Supervisors' Association, held at the Book-Cadillac hotel, Detroit, Mich., August 26 to 28, inclusive, the proceedings of a portion of which were reported in the September *Railway Mechanical Engineer*, one of the most important actions taken was to change the name of the association. The association consists of two former groups of car men united at St. Louis, Mo., in 1928. At that time, in order not to block the consolidation plans, certain concessions not satisfactory to all of the members were made regarding the name of the association. During the last session of the Detroit meeting, the membership was unanimous in voting to re-adopt practically the identical name formerly held by the parent association. The word "Railway" has simply been dropped, and the association is now known as the "Car Department Officers' Association."

The total registration at the Detroit convention was 319, of whom 159 were railroad men and 78 supply men. Forty-two supply companies had representatives in attendance at the convention and participated in the exhibition of equipment and supplies. Following a brief address by President C. J. Wymer, superintendent of the car department, Chicago & Eastern Illinois, the feature of the opening session was a paper presented by T. C. Powell, president of the C. & E. I., as abstracted in last month's issue.

Another paper of unusual interest was that by J. C. Scheidel, district superintendent of car repairs, North American Car Corporation, Tulsa, Okla., who discussed the means by which railroad mechanical departments can assist in improving the service rendered to private line car owners. L. R. Wink, representing W. E. Dunham, superintendent of the car department, Chicago & North Western, presented a paper, outlining briefly the methods and advantages of systematic repairs to freight cars. C. R. Megee, district manager A. R. A. Car Service Division, described the efforts of the division to increase the efficiency of car use and expressed appreciation for the co-operation received from car men, inspectors and shippers in his district. He stressed the importance of more accurate commodity carding in the interests of reduced cross haul and lessened switching expense. W. S. Topping, assistant chief inspector, Bureau of Explosives, discussed the important subject of the safe handling of explosives and other materials, expressing the hope that the revised I. C. C. regulations, to be issued October 1, will prove an acceptable improvement over any preceeding issue. For example, all of the principal rules affecting the carriers and their employees are segregated in a single section, No. 4, and can be much more readily located and learned by the employees.

Car Loading

E. Dahill, chief engineer, A. R. A. Freight Container Bureau, presented some interesting and highly-instructive moving pictures dealing with methods of loading cars to reduce damage in transit and resultant claims. W. A. Kuechenmeister, personnel manager, Dominion Forge & Stampings Company, Walkersville, Ont., delivered an able address on safety first. Mr. Kuechenmeister demonstrated clearly that, in addition to all its other advantages, safety work is so closely allied with production efforts that, when railroad men have taken

all of the steps necessary in the interests of maximum safety, they have thereby done the very things essential to produce the highest unit output.

An individual paper on air brakes was presented by C. R. Childs, air brake supervisor, New York, Chicago & St. Louis, Cleveland, Ohio, and one on the relations between the car and the stores department by F. E. Cheshire, general car inspector, Missouri Pacific, St. Louis, Mo. Committee reports included one on wheel failures, W. J. McClennan, general shop inspector, New York Central, chairman; elimination of oil and grease spots from box car floors, F. J. Swanson, district master car builder, Chicago, Milwaukee, St. Paul & Pacific, Minneapolis, Minn., chairman; elimination of damage to automobile car floors, M. J. Mills, master car builder, Pere Marquette, Detroit, Mich., chairman; A. R. A. interchange rules, M. E. Fitgerald, general car inspector, Chicago & Eastern Illinois, Danville, Ill., chairman; A. R. A. billing, E. S. Swift, chief A. R. A. clerk, Wabash, Decatur, Ill., chairman.

Election of Officers

On the last day of the convention, the following officers were elected for the ensuing year: President, K. F. Nystrom, superintendent of the car department, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis.; first vice-president, F. A. Starr, superintendent of reclamation, Chesapeake & Ohio, Huntington, W. Va.; second vice-president, E. J. Robertson, superintendent of the car department, Soo Line, Minneapolis, Minn.; third vice-president, C. J. Nelson, chief interchange inspector, Chicago Car Interchange Bureau, Chicago; fourth vice-president, A. J. Krueger, master car builder, New York, Chicago & St. Louis, Cleveland, Ohio. A. S. Sternberg, master car builder, Belt Railway of Chicago, was re-elected secretary-treasurer.

The retiring president, C. J. Wymer, superintendent of the car department, Chicago & Eastern Illinois, Danville, Ill., automatically became chairman of the board of directors. Other members of the board, including six new members just elected are as follows: F. A. Becherer, assistant superintendent of motive power and equipment, Central Railway of New Jersey, Jersey City, N. J.; R. J. Overton, general foreman of car repairs, Southern, Spencer, N. C.; D. E. Bell, A. R. A. instructor, Canadian National, Winnipeg, Man.; P. Kass, superintendent of the car department, Chicago, Rock Island & Pacific, Chicago; G. D. Minter, district car inspector, Norfolk & Western, Portsmouth, Ohio; J. P. Egan, superintendent of car inspection and maintenance, New York, New Haven & Hartford, New Haven, Conn.; J. S. Askworth, mechanical superintendent, General American Tank Car Corporation, Chicago; E. S. Smith, master car builder, Florida East Coast, St. Augustine, Fla.; T. J. O'Donnell, chief interchange inspector, Buffalo, N. Y.

The exhibition of equipment and supplies this year was provided under the direction of the Supply Men's Association with President J. T. Cralley, Union Metal Products Company, Chicago, in general charge. New officers of the Supply Men's Association were elected for the ensuing year, as follows: President, C. F. Weil, American Brake Shoe & Foundry Company, Chicago; first vice-president, E. H. Hall, Milar Clinch & Co., St. Louis, Mo.; second vice-president, K. M. Hamilton, The Bettendorf Company, Chicago; third vice-president, Karl Milar, Milar Clinch & Co., Chicago; fourth vice-president, E. H. Weaver, Westinghouse Air Brake Company, Chicago; secretary-treasurer, Bradley S. Johnson, W. H. Miner, Inc., Chicago. Directors of the Supply Men's Association include: F. E. Dodge, National Lead Company, Chicago; J. H. Schroeder, Union Metal Products Company, Chicago; J. W. Fogg, MacLean-Fogg Lock Nut Company, Chicago; R. J. Miner, W. H. Miner, Inc., Chicago; C. V. Broadley, American Steel Foundries, Chicago; E. H. Mattingley, Standard Auto-Tite Joints Company; E. E. Thulin, The Duff-Norton Manufacturing Company, Chicago; A. G. Dohm, Camel Company, Chicago; W. C. Saunders, Timken Roller Bearing Company, Canton, Ohio.

Wheel Failures

By W. J. McClennan

General shops inspector, New York Central, New York

In preparing this paper on wheel failures, it became apparent that its primary purpose should be to give full publicity to the fact that wheel manufacturing, railroad operating and mechanical forces have in recent years made a most remarkable contribution toward the reduction of wheel failures, the campaign for better maintenance of brakes having been an important part of a co-ordinated program.

The American Railway Association Wheel Committee and The Association of Manufacturers of Chilled Car Wheels contributed substantially. They have been preeminent in the analysis of defects and in devising remedies, and their knowledge, experience and authority have invested their recommendations with great value.

It is also purposed to show how the reduction in wheel failures has been accomplished and to point out the necessity for continued, and if possible, more aggressive vigil in the future.

In this outline only defects or other causes of failure which result in actual or potential train delays will be considered as coming within the scope of the assigned subject, and because of their predominance, also the limited time allowed, consideration will be given only to cast-iron or chilled-tread wheels.

Such defects and the number occurring on chilled tread wheels under freight-train cars of one railroad in 1929 are listed below, in order of their prevalence. For comparison, 1928 data are shown in the last column.

Failures of Chilled Tread Wheels Under Freight Train Cars

Cause of failures	1929 Failures	Per cent of total	1928 Failures
Overheating (wheels broken, or cracked in plate)	485	90.	533
Burst hub due to improper mounting	16	3.	32
Low chill	21	4.	11
Seams in tread or throat	1	0.25	11
Narrow gage	1	0.25	0
Hollow tread or slaggy rim	0	0.	3
Unknown	9	2.	0
Total of identified failures	533	..	590
Failed wheels not held for examination	2	0.5	24
Total failures	535	100.	614
Total causing actual delays	63	12.	80
Total representing potential delays had same not been detected by inspectors	472	88.	534

A total of 108, or only 20 per cent of the 535 failures occurred on wheels made for this carrier and in use under owned, leased and foreign cars operating on its line, whereas 397, or 74 per cent happened on wheels made for foreign roads and in use under all cars operating on line of the reporting road. There are no available data as to the other 30 wheels, but these represent only 6 per cent of the total.

Failures will greatly diminish when all companies require that every wheel in use will have been manufactured in accordance with existing or subsequent A. R. A. specifications.

Further analysis to discover facts connected with these 535 failures in the year 1929 shows that only 120, or 22 per cent existed on wheels of nominal weight of less than 650, 700, 750 and 850 lbs., in spite of the fact that wheels of the present specified weights were adopted as recommended practice in 1920 or earlier.

As the average life of chilled tread wheels is estimated to be about ten years, one feels free to state that over 90 per cent of the wheels in use in 1929 were of nominal weight, whereas only 76 per cent of the failures occurred on such wheels.

Total failures will be greatly reduced when all light-weight wheels disappear entirely.

Of the 535 wheels failing, 73, or 14 per cent, were those of manufacturers now out of business or absorbed by larger companies.

In 1929, 75,344 owned and leased cars were operated on line of reporting carrier. Up to close of that year at least 209,803 single-plate chilled-tread wheels had been purchased. Failures occurred on four, representing .0019 per cent of the total single-plate wheels purchased, and two of these were attributed to burst hub, due to improper mounting. One was found on inspection and the other did not cause a delay costing $150.00 or more, therefore none of them were shown on I. C. C. reports. The latter show three failures of single-plate wheels on all Class I railroads during year 1929, and it is understood that about 2,950,000 single-plate wheels were in service as of the end of that year. This represents .0001 per cent.

Since 1927 there has been a marked decrease in the tendency toward failure of comparatively new chilled tread wheels, doubtless traceable to the advent of the single-plate wheel and better braking conditions.

Following out the purpose of showing that wheel and air-brake manufacturers and railroad forces are to be accorded full credit for the improvements in material, design, method of manufacture, superior train and brake performance, more careful inspection, more efficient classification-yard and wheel-shop practices, it is appropriate to cite data evidencing the fact that such efforts have been conducive in recent years to a very material decrease in the number of chilled-tread wheel failures.

The 1929 records of the same reporting trunk line disclose a 53 per cent reduction in the number of delays of freight trains attributable to defective chilled-tread wheels, compared with records of 1927, in spite of an increase in number of cars on line.

The efforts of the manufacturers and railroad forces have also reduced the total number of chilled-tread wheel failures, representing actual and potential train delays, as evidenced by the comparison of 1928 and 1929 data, shown in the first table.

At this point, it seems desirable to itemize some of the recent accomplishments to show how cast-iron wheel failures have been reduced:

What the Manufacturers in Collaboration with the A.R.A. Wheel Committee Have Done

1—Introduction of the lip chiller, minimizing seam development and tread breakage at the rim.

2—Development of the process whereby manufacturers were able to reduce the sulphur content.

3—Introduction of single-plate wheel, with its greater resistance to thermal stresses, change in slope under tread, increase in plate and hub thickness and adoption of a balanced design with respect to proper metal distribution and weight of rim, plate and hub.

4—Reinforcement of flange, providing enough metal to allow for deeper chill and increased wheel strength.

5—More metal was thus placed in the tread and flange where heat from breaking develops, also in the plate and hub, to which it passes. The extent of the resistance to thermal stresses in the single-plate wheel is borne out by the fact that the thickness of the ring of molten metal used in acceptance tests has been increased from 2 in. to 3 in. as provided in A. R. A. specifications, and inspectors report that the severity of this test is not causing failure in the foundry, or consequent rejection. In service the wheel is certainly standing reasonable braking abuse.

6—As a result of tests conducted at the University of Illinois in 1922, it is doubtless safe to state that the single-plate reinforced-flange wheel has an ultimate strength capable of withstanding all the strains existing when subjected to the total effect of mounting, static load and side thrust pressures. Consequently, if we can eliminate overheating, we can minimize failures of single-plate wheels. The actual flange pressure, irrespective of track curvature or train speed, was found to be 25 per cent of the weight on three wheels, or 75 per cent of the weight on one, therefore the design of the 750-lb. single plate wheel was based on its ability to withstand 75 per cent of the 21,125 lb. weight imposed on each wheel of the 100,000 lb. capacity car, or 15,844 lb. and a factor of safety of about seven was then incorporated in the design calculations in order to provide for unusual track and load conditions. Further tests at the same place developed that the reinforced flange on sample single-plate wheels produced an increased strength, compared with former standard flange, of from 10 per cent to 90 per cent in the case of badly worn flanges, and 26 per cent to 49 per cent in the case of slightly worn or new flanges.

What the Railroads, Supplemented by A.R.A. Wheel and Air Brake Committees, Have Done

1—Inauguration, in recent years, of an intensive program of wheel inspection at classification yards, repair points and wheel shops, which has been conducive to a remarkable prevention of train delays, best exemplified by the fact that in year 1929, the inspectors of one railroad, which is believed typical, detected 472 wheel failures which would have caused train delays, as against 63 failures actually causing such delays.

2—Promulgation of A. R. A. Wheel and Axle Manual, has made mechanical-department forces wheel-minded, and fortunately so, as the running gear of our freight equipment calls for an up-to-the-minute brand of knowledge and attention in these days of scheduled thousand mile, third-morning delivery freight trains, longer, heavier and faster than ever before. The A. R. A. Manual is considered by writer to be one of the most constructive pieces of co-operative railwork ever presented.

3—Enforcement of a well directed program for maximum brake maintenance. Designated points are equipped with test racks to secure improved maintenance of triple valve, particularly proper friction tolerances and minimum packing-ring leakage. Competent testers are employed and all valves must pass the code of tests. It is believed that a check on almost any road will disclose that only 8 or 9 per cent of the triple and cylinder cleanings are out of date, as compared with 20 to 30 per cent about seven years ago.

3a—The new lap-joint piston rings for triples have been adopted on road of the reporting carrier. They tend to reduce ring leakage and because of their longer life expectancy, will minimize the bad effects of leakage.

3b—It is reported that one carrier reduced its slid

flat wheels from 350 pairs per month at one station to six pairs per month over the entire road, attributing the improvement largely to the installation of a new design of locomotive feed valve, in connection with which they gave out figures on car miles per slid-flat wheel which showed that they increased from 13,600 in 1926 to 40,400 in 1928. The main purpose of this new feed valve is to permit handling of a larger volume of air and, through simplicity in valvular construction, to decrease shop maintenance costs.

4—The improper handling of brakes by certain enginemen can generally be detected by train riding tests, and corrective measures taken.

5—Those who sponsored the brake lever badge plate requirements of A. R. A. Rules 3 and 61 must be secretly proud of their efforts. They have made a fine contribution to reduction of wheel failures, as any good wheel on a car with good triple might fail when the braking power was 90 per cent, or even 125 per cent, instead of 60 per cent, due to improper power or weight arm dimensions.

More Aggressiveness Needed in the Future

If, in spite of the progress made in reducing wheel failures, some are still failing, what shall we do? You have all heard of the party who proposed to abolish danger by preventing motion. But, seriously, we can work harder than ever with our present facilities and talents, and all of us can proceed to show more hospitality toward intelligent change. When in doubt as to what to do, we can start doing something. The minor detail tasks that can be done (or slighted on the assumption that no one will notice the difference) should be pursued with more aggressiveness than ever. On the other hand, details should not obscure the major issue as we must be big enough to visualize the outstanding factors of the problem, and intelligent enough to make decisions when the facts are unfolded.

Chilled car wheel manufacturers can probably find ways and means of insuring liberal chill depth on every wheel made in the future, as 4 per cent of the 1929 failures on one road were due to low chill.

Air-brake manufacturers are co-operating in the extensive A. R. A. tests now under way. If these tests disclose that groups of quick-action triple valves have successfully met service requirements far beyond those contemplated at the time they were designed many years ago, but that under some of the very extreme demands imposed upon them by present day railroading, their operation is being externally influenced by affecting the volume of air which they are now required to handle as compared with that necessary when they were originally designed, we may rest assured that the air brake manufacturers will be at the forefront with the remedy. It is not believed anyone will contend that 150-car loaded freight trains were contemplated years ago, nor that the air-brake equipment of milk cars was designed for fifty-car milk trains.

As railroad men, we can secure the widest possible compliance with the A. R. A. Wheel Manual, stressing the necessity for observing A. R. A. mounting limits, also for detecting and scrapping wheels with all grease burned off the outside face. The A. R. A. maximum mounting limits should by no means be exceeded, and examination of hydrauligraph charts may show that they are being exceeded. Axle wheel seats should not be tapered more than ½ in. beyond the dust-guard seats. The tolerance between seats of axles and cast-iron wheels should not exceed two thousandths of an inch per inch diameter of wheel seat. Three per cent of all failures on one road in 1929 were due to improper mounting.

With existing equipment we can bend every effort to see that 90 per cent of future wheel failures are not attributable to overheating.

Braking Details Which Need Checking

Tests made at Purdue indicate that during any train stop the brake shoe pull remains about constant for three-fourths of the stopping distance and that at the point of stopping it increases to double the average amount. The coefficient of friction has a tendency to rise as the speed is reduced and to lower as the temperature of the shoe increases. From such tests, the A. R. A. has set up specifications for brake shoes, requiring the standards of coefficient of friction shown in the table.

The above data are of interest to us only for purpose of showing that some overheating of cast-iron wheels might be traced to operation of cars with steel and cast-iron wheels in the same train as it is claimed that the brake-shoe metal does not provide the same friction on the steel wheel that it does on the cast-iron wheel, and therefore the latter is required to do more than its share of the work of stopping the train.

The necessity of proper brake-beam alignment is also indicated as tests were predicated on full bearing area of the chilled shoes, not on those with a 50 per cent overhang, in which event the friction coefficient per square inch might be doubled, as the stopping time and train speed remain constant.

But we need to do more than study friction coefficients in order to minimize wheel failures due to overheating, as they are usually the result of unequal braking force.

It requires a certain rate of build-up in the brake pipe to get the brakes off a train of ninety or more cars, therefore the use of the latest feed valve which permits handling a larger volume of air and the maintenance of proper brake-pipe pressure is recommended in order to insure the maintenance of a proper rate of build-up.

Coefficients of Friction in Tests of Chilled Iron and Steel Car Wheels

Pressure, lb.	Coefficient of friction, per cent
Chilled iron wheel — Initial speed 40 m.p.h.	
2,808	22
4,152	20
6,840	16
Steel wheel—Initial speed 65 m.p.h.	
2,808	16
4,152	14
6,840	12½
12,000	11

To get brakes off a train a differential must of course exist between brake-pipe and auxiliary-reservoir pressure. To insure this differential the brake-pipe reduction during applications must be sufficient so that, when it becomes necessary to release brakes, there will be no question of a differential existing between brake-pipe and auxiliary-reservoir pressure, the former being higher.

With an inadequate build-up rate, the tendency is that brakes will not release subsequent to applications made while controlling trains on grades, or stopping. If they do not release, sticking brakes and overheated wheels result.

While lap-joint piston packing rings have doubtless been widely introduced, it is felt they should be universally adopted if their use will tend to prevent leakage of auxiliary-reservoir air to the brake pipe during brake pipe reductions and from the brake pipe to the reservoir

during a release, in which event release of brakes may not occur. Surely their use will effect some reduction in the number of overheated wheels.

The manufacturers are recommending that railroad shops discontinue the practice of dry-fitting triple-valve piston packing rings, claiming it is responsible for the chemical development of lead-carbonate, a white powdery substance which adheres to piston and packing ring, tending to bind the ring in the groove. They suggest placing two drops of oil in the ring groove after the preliminary ring leakage test. The binding of the ring in the groove sets up about the same condition as a leaking packing ring and results in wheel trouble if release of brakes does not occur.

Composition Rubber Gaskets for Brake-Pipe Unions

The wider adoption of composition rubber gaskets for brake-pipe unions in lieu of leather will doubtless reduce wheel failures heretofore caused by leakage at crossover unions, with the inevitable result of sticking brakes.

The use of ¼-in. special brass pipe plugs in the gage ports of retaining valves is becoming more general and is especially desirable in this period when the stored car problem is so acute. Without these plugs the gage port is cluttered by wasps' nests, and while brakes apply they do not readily release, resulting in overheated or slid wheels.

When stored cars are again placed in service we will have to watch the triple valve condition very closely as the prolonged storage period will doubtless set up an inoperative condition due to corrosion of working parts. All stored cars should be tested before being restored to service, to determine if brakes apply and release.

Perhaps we may see an abandonment of the 15/16-in. flange thickness limit on cast-iron wheels less than 80,000 lb. capacity and the substitution of the 1-in. limit.

There is a tendency to discard existing brake hangers less than 6 in in length as they frequently permit shoes to creep above the 13-in. limit from the rail to the face of shoe, causing overheated wheels. The recently adopted 24⅞-in. dimension from rail to brake beam hanger fulcrum is indicative of the trend and means that we may eventually have 11⅞-in. brake hangers.

In the gradual application of brake-lever badge plates we will have an unusual opportunity to reduce the number of overheated wheels attributable to excessive braking power ratio. Investigation will disclose that cars are being operated with braking power above or below the required adjustment on one or both ends, thus negativing the advantages of operative triples and cylinders. Based on 50-lb. cylinder pressure, present standards provide in the case of all freight cars that the braking power shall be 60 per cent of light weight, and without entering into the controversy as to whether this ratio is suitable for all equipment, we can see that it is enforced when setting up the proper lever dimensions for each series of cars.

It is believed all concerned are working toward the irreducible minimum in wheel failures. Human lives, the happiness of homes and the future of our children are at stake. Let us bend every effort.

Equipment Painting Section

(*Continued from page 549*)

parent that some roads have not yet had sufficient experience with this class of finish to determine for themselves whether or not it is the most desirable. In the report of the Committee of Direction there is a pertinent comment on lacquer finish which, because of its interest, is quoted in extract as follows:

"The question of lacquer finish for locomotives and passenger train cars versus varnish and enamel finishes has been before committees of the Equipment Painting Section for several years. Exposure tests of panels have been made by the Committee on Tests and other questions relating to these methods of finishing have been considered by the Committee on Equipment Painting Practices and the Committee on New Developments in Equipment Painting with Economies Involved.

"There has been a great change in the materials sold

Freight car paint shop of the Chesapeake & Ohio, Russell, Ky.

under the name of pyroxolin lacquer since this kind of finish was first introduced for railroad equipment. Experience with some of the early lacquers should not be given too much weight in considering these materials as now offered. The experience has also been different with the same materials where conditions of service are different, such as climatic conditions, color, tunnels, smoke, cinders from locomotives vs. oil-burning locomotives, etc.

"Nearly all railroads have conducted service trials of some of these materials. The experience of some, depending upon materials used and conditions of service, have demonstrated that lacquer finish is as durable and even more economical than paint and varnish systems; on the other hand the experience of others has been quite to the contrary.

"It appears that on account of the many conditions of service which vary in the different parts of the country and difference in materials themselves as received from different manufacturers, this is a subject which must be solved by each individual railroad in accordance with its own conditions.

"The committees of the Equipment Section will continue actively to consider this subject and will report any information which they are able to develop as conditions warrant."

Election of Officers

The following officers were elected to serve for the year ending September 30, 1931: Chairman, K. J. Johnson, foreman painter, Nashville, Chattanooga & St. Louis, Nashville, Tenn.; first vice-chairman, E. M. O'Brien, foreman painter, Illinois Central, Chicago, Ill.; second vice-chairman, E. W. Grimminger, foreman painter, Pennsylvania, Altoona, Pa.

The following members were elected to serve on the Committee of Direction for a like period: J. W. Gibbons, general foreman passenger-car department, Atchison, Topeka and Santa Fe, Topeka, Kan.; H. Hengeveld, master painter, Atlantic Coast Line, Waycross, Ga.; B. E. Miller, master painter, Delaware, Lackawanna and Western, Kingsland, N. J.; A. F. Lawson, foreman painter, Pittsburgh and Lake Erie, McKees Rocks, Pa.; D. Warner, foreman painter, Canadian Pacific, Calgary, Alberta; A. E. Green, foreman painter, Chicago & North Western, Chicago. Marceau Thierry, the retiring chairman, and D. C. Sherwood, foreman painter, New York Central, a past chairman, will also serve on the Committee of Direction, the retiring chairman being the chairman of the committee. The Equipment Painting Section voted to hold its 1931 meeting at Cleveland, Ohio.

Maintenance and Care of Paint at Terminals

The report of the Committee on Maintenance and Care of Paint and Varnish at Terminals directed attention to the importance of thorough and systematic cleaning of passenger car equipment not only as a means of improving the appearance of equipment but as a vital factor in the preservation of the finish. The report included the statement that:

"The cost of labor and material for properly cleaning railway equipment is often considered an item of expense, but it is really an investment, if we take into consideration the better appearance of our equipment after being cleaned, and the fact that the accumulation of dirt allowed to remain on the surface for a long period is destructive to paint and varnish. It is essential that the maintenance and care of paint, varnish and lacquers on railway equipment at terminals should be directly in charge of a competent workman, as careless use of emulsions and renovators is not only a detriment to painted surfaces, but makes a heavy job when the equipment is shopped. Oxalic acid solution or a reliable car cleaner does not only add gloss and improve the appearance of the equipment, but it is also a reviver and has a tendency to prolong the life of paint and varnish. With this idea in view the committee makes the following recommendation from which a proper and safe system of cleaning can be employed. Under ordinary service conditions, the exterior of dining, cafe, sleeping, parlor and steel passenger cars, operating in through line trains require first class cleaning approximately every 30 days. Passenger cars, in less important trains, steel baggage, postal, and local cars, every 60 days. Wood coaches, postal, baggage and express cars every 90 days. Refrigerator and box-express cars every 120 days."

Car Washing Machines

This year's report again dealt with the subject of car washing machines indicating a favorable opinion on the use of these machines. The report went into some detail in describing the machines that are now in use on several railroads in this country and concluded with the statement "the committee believes that where the terminal is large enough to warrant the installation of the car scrubbing and washing machine, the railroads would find it a good investment."

The conclusion of this report emphasized the value of giving real attention to the cleaning of passenger equipment as a means of advertising the railroad. One pertinent statement was that "it does not seem consistent to us as railroad employees for a railroad to advertise the beautiful scenery along its lines and then allow passenger car windows to become so dirty that passengers can not see through them. This may not be the case where cars come out of the big terminals where a good cleaning system is in force, but how about the points where cars lay over and there are no cleaners to look after them."

The report was signed by D. H. Tatum, *Chairman* (B. & O.); D. Warner, (Can. Pac.); E. Driscoll, (C., M., St. P. & P.); E. McDade, (G. C. & S. F.); E. J. Ginther, (Wab.); G. F. Dennee, (N. Y. C. & St. L.), and E. S. Wooden, (G. T. W.)

Report on Equipment Painting Practices

The report of this committee was made up of a series of questions submitted by members together with the answers or recommendations of the committee. Three of these, of especial general interest, are abstracted here:

Spraying letters on freight cars—"A number of railroads are spraying their freight equipment very successfully. In spraying letters on freight cars you get the letters well covered, making a solid white letter all tied up at the same time. This committee recommends zinc stencils for this operation, tying the letters together with wire and raising the ties enough from the letter so spraying or stenciling under the tie will be no obstacle. At this time the committee is of the opinion that there is no economy in spraying letters."

Practicability of lacquering over old varnished surfaces

—"The committee believes it is practical to lacquer over old varnish surfaces, providing the varnish is well oxidized and the surface is in good enough condition to permit refinishing. However, best results are obtained where the varnish has been removed by sandblasting and a new surface applied."

Zinc or paper stencils; methods of cutting zinc stencils—"The committee is of the opinion that zinc is superior to paper for making standard freight car stencils—economy and durability considered.

"In manufacturing zinc stencils, the committee recommends the following method: First take the pure lump asphaltum and place in a vessel, adding enough turpentine to cover the asphaltum, then suspend the vessel in a tank of boiling water just deep enough to dissolve the asphaltum, taking care to keep the water out of the vessel. Stir the asphaltum as it dissolves.

"After cooling, add enough pure gum turpentine to bring the mixture to the proper brushing consistency. Then add enough good finishing varnish to retard the flaking of the mixture when scratching out the patterns. There is no set formula for the amount of varnish to be added; the more you add, the slower the asphaltum will dry and the more elastic the film becomes. Next strain the asphaltum and it is ready for use.

"Next coat the piece of zinc on one side and place it on the heat table to dry. Ordinarily this mixture will dry sufficiently to scratch in about 10 minutes. After scratching the pattern on the zinc with the use of a scratch awl the zinc is turned over and coated from the back side and allowed to dry. Then place the pattern to be cut in a vat of muriatic acid, watching it closely as it only takes a minute or so for the stencil to cut; time, of course, depending on the thickness of your zinc and the strength of the acid.

"Vats for stencil cutting are usually made of wood the desired size and about three inches high, with a hole in one corner of the vat, using a glass stopper to hold the acid in the vat while cutting the stencil. After cutting the stencils you can remove this stopper and catch the acid in an earthen jar to avoid any waste.

"After cutting the stencils, wash the asphaltum off, using an ordinary paint brush and benzine. Next take the stencil to a tinner and have him replace the ties, using a good grade of steel wire, letting it raise from the surface so that in spraying or stenciling you can make a solid letter. In making very small stencils this type of wiring is not recommended."

The report was signed by H. B. Weisgarber (Southern), *chairman;* J. H. Whittington. (C. & A); D. C. Sherwood, (N. Y. C.); E. M. O'Brien, (I. C.); R. B. Batchelor, (Wab.); W. F. Schwenk, (Mo. Pac.); W. F. James, (A. C. L.); T. M. Davis, (Sou. Pac.); W. M. Lamb, (Penna.) and C. A. Gildersleeve, (C. & E. I.).

New Developments in Equipment Painting

Glass for Passenger Cars—After careful investigation, it has been developed that double thick American glass, "A" quality, ⅛ inch thick, which weighs from 85 to 100 lb. to the box of 50 sq. ft., is entirely satisfactory for window sash in baggage cars, express cars and branch line passenger coaches. For doors in passenger cars, crystal sheet glass of select quality, ¼ in. thick, is satisfactory. For postal car doors, the Government standard calls for polished wire glass.

If crystal sheet glass is carefully selected, it is possible to use this quality glass in window sash in first class passenger cars. This glass is similar to window glass, which all have a certain amount of wave and unless this is carefully checked up, glass with enough wave to distort the vision is likely to get into the first class car sash, causing complaint. The polished plate glass eliminates any danger of this kind. For dining cars and business cars, polished plate glass should be used both for window sash, $\frac{3}{16}$ in. thick, and for doors, ¼ in. thick.

Shatter-proof glass is being used in the front ends

Freight car paint shop of the Chicago, Milwaukee, St. Paul & Pacific at Milwaukee, Wis.

of electric suburban cars for the protection of the operators and passengers from flying glass, when the glass is broken. It is also being used in front ends of locomotive cabs.

Heat Resisting Glass—Some of the railroads are using a glass that keeps out heat. This glass is being tried out in the desert country. It has a perfectly smooth surface, is about ¼ in. thick and is clear except it has a slightly greenish tint, that can hardly be detected in a large size glass. It has the effect of giving the interior of the car a very soothing and quieting light, excludes all glare and as much as 80 per cent of the heat and transmits 61 per cent of the light.

The railroads have also developed devices for conditioning the air in passenger carrying cars, keeping the air at an even, satisfactory temperature and clean from dust and cinders.

Quick Drying Varnishes and Enamels—The Committee on New Developments tested, in the Atchison, Topeka & Santa Fe Shops, quick drying varnishes and enamels and find that there has been considerable advancement in the manufacture of these materials and their durability, but do not consider any of them equal to lacquer.

Quick Drying Freight Car Paints—The attention of the committee has been called to new formulas for quick drying freight car paints as put upon the market recently by a number of paint manufacturing concerns. Under this process, a new box car may receive at least two coats of paint on the same day and stencilled on the day following. With some of them it is claimed that two coats may be applied and the stencilling done in one day.

These paints have been developed so recently that your committee has not had sufficient time to investigate them thoroughly. However, exposure tests on panels and steel plates are being made and the paints are being applied and tested out in a practical way by a number of railroads on freight car equipment. In due time a report covering these materials will be rendered by your committee.

The report also commented briefly on the subjects of heat absorption of paints; lacquer versus varnish systems and Bakelite.

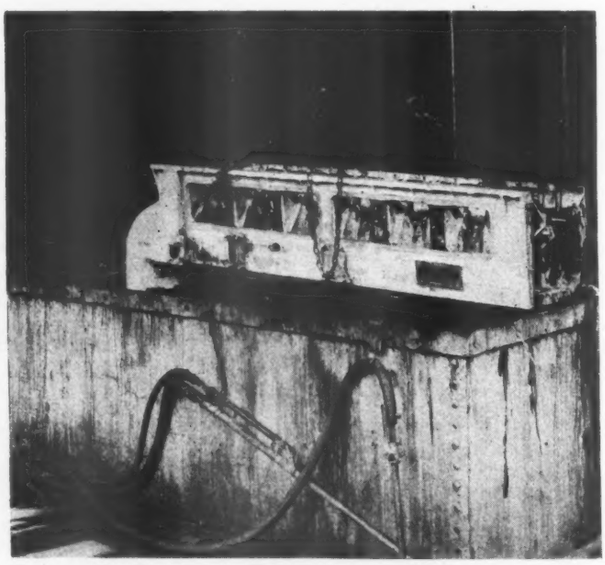
The report was signed by J. W. Gibbons, (A. T. & S. F.), *chairman*; B. E. Miller (D. L. & W.); K. J. Johnson, (N. C. & St. L.); B. F. Fultz, (N. Y. C.); G. S. Corson, (N. Y. C.); Marceau Thierry, (N. & W.) and F. Vogel, (D. & R. G. W.).

Tool Foremen's Convention

(*Continued from page 553*)

Micrometers, 0-in. to 6-in. inclusive, outside measurements.
Micrometers, 2-in. to 8-in. inclusive, inside measurements.
Thickness gage, long blades to be used for fits and clearances.
Screw-pitch gages, 4 to 40 thds.
Gear pullers, screw type, for pinions.
Gear puller, ratchet type, for large gears and wheels.
Stocks and dies, and taps, U. S. S. National and S. A. E. thread, ¼-in. to 1¼-in. inclusive.
Speed wrenches, ¼-in. to 1-in., S. A. E. nuts and cap screws with swivel and ratchet attachments.
Socket wrenches, ¼-in. to 1-in., S. A. E. nuts and cap screws with swivel and ratchet attachments.
Thirty-degree angle S-type wrenches, 7/16-in. to 1-in., S. A. E. nut and cap screws.
S-wrenches, heavy pattern, ¾-in. to 1¼-in, S. A. E. nuts.
Twist drills, 1/16-in. to ¼-in., straight-shank jobbers' stock, 1 7/64-in. to ¾-in. tapered shanks, in 64ths.
Taper-pin reamers.
Hand reamers, solid-body type, by 32nds, ⅜-in. to 1-in. inclusive.
Hand reamers, adjustable type, to follow each other, range ⅜-in. to 1½-in., inclusive.
Valve-seat reamers and stones.
V-blocks and platen grooved for key slots.
Dial indicator with staff lock and clamp.
Set of copper and lead hammers.
Acetylene welding and cutting torches with lead-burning tips.
Hand tools such as hammers, monkey and pipe wrenches, etc.
For correct alignment and fit to close tolerances we suggest an adjustable line reamer for electric motor shaft bearings.
A rack for small motor blocks with full swing in circle and plane so that the block can be turned completely over for convenience to the men working on it.
For cars to be maintained at lay-over points the following list of tools should be furnished:
Speed and socket wrenches, ¼-in. to 1-in., S. A. E. nuts and cap screws, with swivel and ratchet attachments.
Thirty-degree angle S-type wrenches, 7/16-in. to 1-in. S. A. E. nuts and cap screws.
Two jacks, 20 tons capacity.
Set of bearing scrapers.
Set of mandrels .004 in. oversize, crank pins and main bearings.
One-fourth-ton duplex chain hoist.
Spark-plug tester.
Electric drill and air drill.
Set of tools for pulling exciter and race.
Swivel-top bench vise.
Set of shop tools such as hammer, monkey wrench, pipe wrench, etc.

In presenting the above list of tools we believe that too much stress cannot be placed on the importance of building up of proper and accurate precision tool equipment, for it is vital in the upkeep and maintenance of motor rail cars. If tolerances are not kept within close limits it is necessary to bring equipment to the shops and dismantle it for overhaul long before the assigned mileage has been run out of the equipment.



Lye tank where all parts are thoroughly cleansed before rebuilding

The report was signed by W. Smith, tool foreman, Missouri Pacific, Little Rock, Ark., chairman; K. Merting, tool foreman, Chicago, Burlington & Quincy, Lincoln, Neb.; C. Helm, tool foreman, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis., and E. F. Harney, tool foreman, New York, New Haven & Hartford, Readville, Mass.

Master Blacksmiths Meet at Chicago

(*Continued from page 560*)

The first factor to be considered, after the necessary equipment has been installed, is: will it pay to produce dies and trimmers? Do we have enough demand for that forging to warrant the cost of producing dies and trimmers? This is a fact which should be of paramount importance in a railroad shop. Die and trimmer material is also of importance and my experience is that the best die material procurable is the cheapest in the long run.

The designing of break-down and finish impression in dies is of great importance for the items of material cost and quantity of production comes in here. In many cases, the life of the die is determined by the design of die impression. Another factor to be carefully watched is its relation to the trimming of flash.

Relation of Hammer Weights and Forgings

The style and weight of hammer in relation to forgings to be produced should also be given careful consideration and, while I am familiar with both board and steam drop hammers and realize that each has its virtues for different classes of forgings, my opinion is in favor of the steam drop hammer for railroad service on a general run of locomotive and car forgings.

We use a 2,000-lb. steam drop hammer and so far, in the production of railroad general forgings, have found only one instance where this weight hammer was not heavy enough to take care of our drop forging needs, and in this case we overcame the difficulty by reversing the end of the forging in another set of dies.

The drop hammer can also be used to great advantage in many cases in connection with the forging machine and, in this connection, the location of the hammer should be considered, wherever possible, in its relation to the forging machine, for the saving in extra heats will be a considerable factor in costs. The size of dies to be used should also be considered in their relation to the size and shape of forgings to be produced; also in their relation to the safety of the forge man and the life of the dies.

Break-down and finish die impressions are of the utmost importance and great care should be taken to prevent scarfs or cold shuts that might occur through faulty design of die impressions. I have seen many forgings discarded, because of this fault, that could not be detected in the finished forging. The flow of the metal in the die is so confined that laps are covered and smoothed to such an extent that they are not apparent to the eye; consequently, great care should be taken to so design dies that these defects will not occur.

The Trimming Press

The trimming press, of which there are many types, should have plenty of power above what is required for the trimming of forgings, for the railroad shop will find many cases where this press can be used for purposes outside of its regular purpose of trimming forgings. We use an 80-ton press for many jobs formerly done by hand, with a considerable saving in cost and a large increase in production.

The drop hammer and trimming press are important adjuncts to any railroad shop where general forgings are produced and will give a large return on the investment.

Spring Manufacturing and Repairing

By T. F. Buckley

Delaware, Lackawanna & Western, Scranton, Pa.

In the manufacture of new springs the design is important and the first step is the duty of the mechanical engineer. The next is the selection of the steel entering into the spring. I am convinced that the proper way to handle steel is according to specifications recommended by the purchaser or manufacturer of the steel. This combined with good workmanship and proper mechanical equipment will give more uniform and durable springs at reduced costs.

The following operations have been followed with success in the manufacturing of new and reconditioned springs:

Testing old springs—In reconditioning old springs the first operation is to test the springs sent in. These are tested first with a hammer for broken plates. If non-defective, they are then put under the machine and tested. If they stand to the required height they are returned to be reapplied. If they do not stand the test or have broken plates they are sent to the stripping machine and taken apart for reassembly.

Stripping—When springs come to the stripping machine the bands are removed by a hydraulic press. Each plate is gaged for thickness and if found to be 1/32 in. under original thickness it is scrapped and new or old plates are used to replace it. All old plates removed from springs in good condition are re-annealed before reworking into reconditioned springs.

Shearing, nibbing and punching—The next step in the manufacture of new springs is to shear the new stock to length and the nibbing and punching of the plates. In nibbing, the plate is heated at the center and nibbed, first making sure the nib is in the center of the plate. Next comes the punching of the hanger slots which also must be done at the right temperature, and the leaves are ready for tapering.

Tapering and trimming—The leaves are then heated at the ends and passed through the tapering machine. We find that we get a more uniform performance of the spring with tapered than with untapered plates; also get less breakage. After tapering, the plates are trimmed to length, then are ready for the forming operation.

Forming, quenching and drawing—Forming should be done with a properly-equipped furnace where the temperature is gaged by pyrometers. Here the plates are heated to the temperature specified by the manufacturer of the steel. They are then taken from the furnace to the forming table where they are formed to proper radius and quenched in oil. With the use of the forming table, there is little loss in temperature from the time the plate leaves the furnace until entering the quenching room. The time in the quenching medium is important. The plate should be allowed to cool to the temperature of the oil before being removed from the vat. The temperature of the oil vat should be kept at about 250 deg. F.

Some recommend laying the plates down to cool after forming, and to harden them later. From several tests made, we could find very little difference in grain structure in working new steel, whether formed and quenched, or formed and laid down to cool and hardened later at a temperature of between 1,450 and 1,500 deg. F. We find that in working old plates we

get a finer grain structure when forming and quenching in one heat, if the plates are properly annealed before reworking. In reconditioning old springs, every plate should be reworked.

With an improved forming machine now on the market, maintaining the furnace temperature at 1,600 deg. F., and with little lost time between furnace and forming machine, there is little loss in temperature. This improved machine drops the plate into the quenching medium. This is accomplished by a section of the forming table lowering to a vertical position in the oil vat. By getting the plates into the oil vat in a vertical position, there is little warpage. It also eliminates handling of plates from the forming table to the quenching medium. Also, in the quenching vat there is a conveyor line which removes the plates from the oil vat at the proper time. This machine is equipped with a magnetic attachment at the crossheads which holds the formation and also detects any plate which is under required temperature when coming from the furnace. If the plate is not at the required temperature for quenching, these magnets will hold the plate and not allow it to drop into the oil. There is no difficulty in getting the proper heat treatment and correct hardness with this improved equipment.

The tempering or drawing of the plates is an important factor in the life of the spring. This drawback can either be accomplished with a dry heat furnace or liquid bath equipped with pyrometers. Plates should be drawn to a temperature specified by the manufacturer of the steel, which is about 750 or 800 deg. F. The time in the drawback depends upon the thickness of the steel.

Assembling and banding—Next is the assembling and banding of the spring. The spring is set up on a horizontal table and pressed together with a hydraulic plunger. The spring is swung to a vertical position and a hot band slipped over the end. The spring is now swung back to a horizontal position, the plunger released and the spring is pushed under a hydraulic press where the band is pressed on firmly. The band is allowed to cool under pressure to about 500 deg., when the spring is removed from the bander.

Testing—The springs are now ready for testing. Each spring is tested to one and one-half times its working load. This is repeated several times, then the spring is released to working load and measured for loaded height. We are allowed ⅛ in. over or ¼ in. under loaded height. If springs do not stand up to this specification, they are rejected.

General Foremen Hold Twenty-Fifth Meeting

(*Continued from page 558*)

governing factor; others that both are; while others state that the time limit set for the car is the governing factor.

Do you call the attention of Pullman officials to the condition of their equipment in your passenger trains? The majority of the roads replied stating that they do and in some cases, most emphatically; while in some cases this is left to the transportation department.

Do you spot brass to the journals of passenger cars? Practically all roads replying state they spot the brass while others have gone so far as to construct a machine to wear the brass down to fit the journal under pressure on the journal which is to be applied to the car. This, of course, only applies where wheels are removed.

The report was read by the chairman of the committee, W. J. McCloskey, general car foreman, Illinois Central, Centralia, Ill.

Inspection and Repairs to Gas-Electric Rail Cars

This topic has to do with inspection, maintenance and repairs to gas-electric rail cars. First of all, cars should be selected according to the duties it is called upon to perform, and the territory that they are to be used in; assuring ourselves that the cars will have a reserve of power, and will not be used on runs where they will be taxed to their maximum capacity, as this will contribute to heavy and expensive maintenance, and very unsatisfactory operation.

Running Condition

The operator, who detects early indications of abnormal conditions and reports them promptly aids the maintenance force, for operating conditions bring out certain facts that would be difficult or impossible to detect at a terminal.

Proper lubrication is of major importance, the proper grade of lubricant must be applied at definite intervals as per instructions and care must always be exercised to keep all lubricants clean and free from foreign matter, of any kind. Traction-motor oil-box covers, especially, should close tightly to exclude dust and dirt; the dirt accumulated on the outside of these covers should be removed before the cover is opened. Over lubrication is nearly as detrimental as lack of lubrication. Excessive oil and grease collects road dust, and dirt which not only may get to some bearing surface but also presents an untidy appearance to the traveling public. Excessive oil also weakens electric insulation materials and collects carbon dirt from brushes, making convenient current paths and inviting short circuits. Uncleanliness then, from any cause, may result in excess wear on bearing surfaces, short circuits in electric equipment, unfavorable reaction from the traveling public and last but not least presents a potential fire hazard of no little importance.

These cars are subject to daily inspection, which includes any adjustment or repairs reported by the engineer or operator, and in addition the maintainer examines the oil level in the crank case, checks and refills the engine cooling system, checks ignition, pneumatic switches, etc, drains sediment and water from wells of main gasoline tanks, and tests air brakes, horn, headlight and signal equipment.

In addition to the daily inspection some railroads have adopted a system of periodical inspections on a mileage basis, as follows:

Class 5 Inspection—1,200 Miles

Besides the daily routine inspection, the following adjustments will be made:

Engine

Remove and clean spark plugs; reset firing points.
Check valve clearances.
Check oil level in governor.
Fill grease cup on tachometer.
Examine and correct any oil leaks.

Tighten all bolts on entire engine such as manifolds, magneto, brackets, etc.

GENERAL

Remove and clean gasoline strainer bowl.
Examine generator engine coupling bolts.
Fill grease cups on spark and throttle control shaft bearings.
Check spark and throttle mechanism for any loose or worn parts.
Check gasoline vacuum line connections for tightness.

ELECTRICAL

Clean off covers and check oil depth in frame head and axle cap wells, adding oil if necessary.
Examine lubricating compound in gear cases.
Check air gap at bottom of motors.
Examine brushes and brush holders.
Note commutators for appearance or signs of burning, pitting of copper or high mica, see that slots of commutator are free from carbon or copper dust.
Blow out motors with clean dry air, see that drain holes are open after cleaning and ventilation is unrestricted.

CONTROL SYSTEM

Inspect toggle switches and if necessary clean and adjust.
Inspect and clean all line switches, reversers, interlock contact.

BATTERIES

Check specific gravity of each cell of battery.
Examine battery terminals.
Fill battery cells with distilled water.

Class 4 Inspection—2,400 Miles

Do all work as specified in Class 5 inspection and in addition do the following:

ENGINE

Drain crank case and oil filterer. See that filterer is thoroughly cleaned.
Refill crank case with specified grade of engine oil.

MAGNETOS

Wipe off brush holders and distributors, clean and if necessary file and adjust breaker points to proper gauge.
Check couplings for looseness of bolts and flanges of shafts; also for proper functioning.

GENERAL

Check cooling system for water leaks.
Check gasoline system, lines, etc., for leaks.
Check complete air system for leaks.

GENERATORS

Wipe out any grease which may have worked out of bearings between generator and exciter.
Examine brush springs for proper tension.
Clean commutator.

AIR-COMPRESSOR MOTOR

Inspect, clean and if necessary smooth contacts of compressor governor with a file.
Check inside cover insulation, renew if necessary.
Examine oil in air compressor.

TRUCKS

Lubricate side bearings and center castings, and check side bearing clearance.

Class 3 Inspection—4,800 Miles

Do all work as specified in Classes 4 and 5 schedule, and in addition do the following:

TRACTION MOTORS

Inspect all motor bearings.
Remove fiber wool waste and repack all bearings.
Clean dust and dirt from traction motors and motor drive truck.

CONTROLS

Check all air valves on pneumatic switches for leaks and sluggishness.
Check all line switches and reversers. Give special attention to piston rod insulators. See that reverse fingers have the standard tension of 6 to 8 lb.

AIR SYSTEM

Clean and set reducing valves.
Clean triple and brake valves.
Test brake pipe and air pipes in general for leaks.

Class 2 Inspection—24,000 Miles

Do all work as specified in Classes 5, 4 and 3 schedule and in addition do the following:

ENGINE

Remove top cylinder heads, clean carbon, grind in valves.
Remove pistons and rings, clean all carbon out of oil leads, to piston pins.
Remove carbon from oil rings.
Inspect connecting rod bearings for cracks, looseness of dowels, etc.

GENERAL

Motors, generators and engines should be given thorough cleaning and inspection on this periodical inspection and correct all irregularities, changing oils in the different wells and cavities, also motor leads, wiring and connections should be thoroughly inspected for loose connection and worn insulation.

The majority of engines in gas-electric cars are of the overhead valve type. From the standpoint of economy and of good workmanship it is found best in handling class 2 inspection at outlying stations to have the main shop where the general overhauling is done, forward to the outlying station a full set of top heads with valve ground and ready for application so that all it will be necessary for the outlying station to do would be to remove old heads, clean carbon and apply new heads. This cuts down the time that is necessary to hold the car out of service and also eliminates the necessity of equipping small stations with valve facing and valve grinding machines, and numerous other tools and equipment for handling this class of work.

Class 1 Inspection

Class 1 inspection, or general overhauling, depends entirely upon the kind of service these cars are used in, also on the thoroughness of the inspectors and maintainers of the car. The mileage between general repair averages from 250 to 300 thousand miles. An average taken from two different railroads operating these cars and using approximately the same method of handling as outlined in this article show that the gas-electric rail cars compared with the steam locomotive show about a ten-percent decrease in car shop days.

General Overhauling

By continued improvement in facilities, better operation and increasing confidence in this type of equipment along with a complete unit replacement program, these cars are operating an increasing number of miles between shopping periods, and are requiring fewer days for a complete general overhauling. Certain inherent design weaknesses have been overcome and new improvements added.

In overhauling these cars, for the sake of uniformity, the recommendation of clearances and tolerances issued by the manufacturers are followed if possible. Preceding the car to the shop for general repairs an itemized write-up of the general condition of the car from the outlying station where the car has been operating enables the shop forces to have complete units such as a complete power truck, main generator, fan motor, or electric air compressor ready for application. These cars can then be overhauled in record time.

By having these complete units ready at all times, the back shop serves a two-fold purpose: To keep cars in revenue service by supplying to outside points such replacement units as it is possible for them to install, and also for prompt application to a car which is shopped for general overhauling.

Handling of Material and Repair Parts

For convenience in checking and economy in handling, all repair parts for motor cars should be under the jurisdiction of the stores department. Stock sheets should be kept on all repair items and inventoried

monthly, and the supply ordered based upon an agreed working stock derived from previous consumption.

It is necessary to carry sufficient repair items for running repairs, at all points where cars are in service, but the general stock should be carried at the storehouse where centralized repairs are made, and the terminals making minor repairs should obtain their needs from this definite source of supply.

Material for motor-car repairs at the centralized repair shop should consist of complete units, such as cylinder-head assembly, oil-filter assembly, pistons and sleeves complete with rings, oil pumps, carburetors, etc., available for immediate shipment. Such material should be segregated at a given point in the storehouse and all items properly marked, giving full description of parts, including manufacturers' part numbers.

Repairs to defective parts should be made at the centralized shop on storekeeper's shop order, in order to determine the cost for a comparison between new and repaired value, and repaired items returned to storekeeper's stock for use at the home terminal or distribution to outlying points.

Immediate attention must be given broken and defective units removed from motor cars at outlying points, and prompt shipment made to the centralized repair shop. Prompt shipment of such items is conducive to the prevention of delays to cars undergoing reconditioning or extensive repairs, and tends to eliminate the purchase of new units for emergency use.

The report was read by the chairman of the committee, W. H. Longwell, general foreman, Baltimore & Ohio, Gassaway, W. Va.

Traveling Engineers Hold Convention

(*Continued from page 556*)

tion of all bearings, of the power in general, of the firebox, brick arch, tubes, etc.

Reports received by the committee indicate that more failures occur on the first division than on the following divisions over which the engines run, indicating that if the engine is properly serviced prior to departure the likelihood of failure is reduced to a minimum, and if not properly serviced the defect will develop in the first part of the run.

It is also essential that a close check-up be kept of the condition of the fires brought in by the incoming fireman, as one cause of delay is found to occur through the fireman bringing in his fire in bad condition.

The analysis proves that the mileage of the individual engine run has little or no effect on the number of engine failures.

The committee feels that the question might possibly arise relative to equipment in use on longer runs. It is found that in order to successfully handle long runs in first-class passenger service and in manifest freight service, the modern high-wheel engines having superheaters, brick arches and power reverse gear are essential, and also mechanical lubricators, grease lubricators on rods, engine truck and idler boxes, driving boxes and motion work.

From information gathered by the committee, it is found that the effect of extending runs on passenger train schedules is nil; that is, operation of passenger schedules has not in any way been affected due to extending locomotive runs, as it has been found that the time given for passenger trains to transact station business, passengers, baggage, etc., approximately five minutes, is quite sufficient for the changing of engine crews and preparing the engine. Faster schedules are in effect today along with extended locomotive runs than at any other previous time in railway history.

Terminal Savings

As well as the terminal savings before mentioned, the importance of saving in coal, which results from increased locomotive runs over two or more divisions, should be given consideration. It is a well-known fact that a large quantity of coal, more or less, is lost in cleaning the fire, while also a like amount of coal is necessary in rebuilding that fire before it is placed in proper condition for the handling of the train. Both these amounts of coal are saved by running the engines through the terminal. The amount of coal needed for firing up a modern locomotive has been estimated through efficiency tests at 1½ tons, that is, firing up the engine and placing same on the train. Another large item is the saving in the dead-heading of engines between enginehouses and passenger stations. In addition to this there is the decreased cost of handling cinders and coal at intermediate division points; this applies to passenger engines only, not to freight engines.

The report was signed by R. A. Phair, master mechanic, C. N., Montreal, Que.; B. J. Feeney, traveling engineer, I. C., Memphis, Tenn.; D. L. Forsythe, general road foreman of engines, Frisco, Springfield, Mo.; C. G. Holdredge, district road foreman, Southern Pacific, Los Angeles, Cal.; and J. M. Nicholson, fuel conservation engineer, A. T. & S. F.

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Wide World

Unusual Diesel locomotive for Chilean Railway

Recently completed for the Junin Railway in Chile, this 32-ton 300 hp. Diesel locomotive will operate on a track 4,000 ft. above sea level. It is shown on the maker's test track at the foundry of Hudswell, Clark & Co., Ltd., Leeds, England, where successful trials have just been completed. The locomotive, which has a 2-6-2 wheel arrangement, is designed for 2 ft. 6 in. gage track

EDITORIALS

Clean Up Before Winter

NOW is the time to get your shop yards, storage areas, buildings and equipment *extra* clean and orderly. Of course, any well-managed shop or terminal is clean and orderly all the time—"Cleanliness and orderliness is a true indication of efficiency." Nevertheless, the winter months of ice and snow make it difficult to keep the grounds and buildings in first class condition, and is not the time to undertake any program of painting or rearranging of equipment or stores. What you do now will in a large measure be the completion of your cleaning-up program until spring. The establishment of a high standard now will be a big asset toward maintaining a clean and orderly shop during the coming winter.

Getting Production from Special-Purpose Machines

THE introduction of special-purpose machinery in the railroad shop to facilitate repairs and to increase the efficiency of shop operations has in many instances resulted in many idle hours for these particular machines in shops where there is not sufficient work of the type for which they were designed to keep them in continuous operation. Although they are capable of speeding up single jobs, they do not, in many instances, aid in increasing the efficiency of the shop as a whole.

In an effort to cope with this problem, a complete analysis should be made of all jobs which could be completed or partially completed to advantage on new machines in order to determine whether or not they could be finished in less time and at a reduced cost on the new installation. This could be done whether the machine was designed for a single purpose or not.

The management of an eastern railroad shop, being confronted with such a problem upon the purchase of a rotary milling machine, made such an analysis. Comparative studies of various operations on the newly purchased rotary milling machine, the planer and the slotter were completed.

Aside from trepanning rods, the machine is employed in milling rod brasses for sweating, milling driving-spring seat bosses, Walschaert valve-motion links, both ends of draw bars and safety bars for locomotive and tender fits, radial buffer castings, clearances on spring equalizers, valve motion parts after building up worn faces by welding, and eccentric cranks. The machine is employed to its capacity and has facilitated both the back-shop and the heaver classes of running repairs.

The number of operations which can be readily completed on new machines are not always appreciated by shop foremen. A careful analysis of all possible operations should be made on any new machine installation to determine the relative costs of production of old and new methods. Even though old equipment may be doing a satisfactory job, new special-purpose machines may suggest a cheaper and faster way of completing the same job even though it was not necessarily designed specifically for it, thus aiding in keeping the machine in continuous operation and in increasing the efficiency of the shop.

The Foreman's Wages

WHAT is the actual hourly wage of the foreman who spends 12 hours a day, 28 days a month in the enginehouse? Assuming that the average enginehouse foreman receives a wage of $275 a month and that he is on duty 12 hours each day, he would receive an approximate daily wage of $9.80. On an hourly basis, assuming that he would receive time-and-one-half for all time over eight hours, this would amount to a rate of 70 cents, or 10 cents per hour less than that which the machinist receives.

The foreman is chosen for his knowledge of locomotive maintenance work, his ability to handle men, and to make quick and accurate decisions. Notwithstanding the fact that he possesses these qualifications, he receives less remuneration than those who follow his instructions and orders would receive for the same working period. The realization of this fact does nothing to alleviate the grind of his twelve-hour shift.

When foremen in other departments of the railroad and in other industries generally are working eight hours a day and are earning wages which compare favorably with those of the enginehouse foreman, how long will the railroads be able to find men of high caliber who will be willing to sacrifice all personal interests for a monthly income which in effect offers them nothing whatever in return for carrying a heavy load of responsibility?

Industrial Museums

IT has been said that the museum at South Kensington, England, with its extensive exhibit illustrating the stages of development in the marine field, has been an important factor in stimulating an interest on the part of many men who have entered the naval and merchant marine service of Great Britain. It is not much more than 150 years since the world entered the period of invention, and modern industry can be measured in terms of a comparatively few generations. In order that industry may be developed along the right lines it is important that material may be readily available by which its growth may be studied in detail. There are several important industrial museums abroad, but only within recent years has consciousness developed in this country for the need of this sort of institution. Railroad men have gained some conception of its importance and value because of the pageant and exhibit

which was made by the Baltimore & Ohio on the occasion of the celebration of the one hundredth anniversary of the granting of its charter. Henry R. Towne in the east, and Julius Rosenwald in Chicago, appreciating the value of industrial museums, have both made contributions which are being used for the establishment of industrial museums. A good start has already been made in the collection of such material by the Museums of the Peaceful Arts in New York City, and contributions are also now being solicited by the director of the Rosenwald Industrial Museum in Chicago. Unfortunately, many valuable relics of earlier inventions have been scrapped and destroyed in recent years as production processes have been intensified and modern machinery has been developed. A Newcomen engine, for instance, which stood for many years on the shores of Newark bay was junked, as was also the Corliss beam engine that operated for so many years in the Pullman works. It is believed, however, that many examples of large or small tools and equipment which should be placed in such museums are still available. The directors of the Rosenwald Industrial Museum, 300 West Adams street, Chicago, or of The Museums of the Peaceful Arts, 200 East Forty-second street, New York, will appreciate advice as to relics of this sort, and any assistance which may be rendered in securing them for these museums.

More Effective Insulation and Ventilation Needed

THE past summer season has simply served to emphasize in the minds of many railroad men the necessity of providing for more comfort in passenger equipment of all types, not only additional-fare cars but "day coaches" which ought to be the most profitable type of passenger vehicle on the roads. The temperature and condition of air as regards humidity and circulation in passenger cars operated in relatively northern latitudes during the summer frequently presents an almost unbearable discomfort which undoubtedly has a highly deterrent effect upon passenger travel.

Experiments are being made with air-cooled and air-conditioned cars, of which it may be said that they have demonstrated their practicability from a mechanical standpoint and their immense popularity with the traveling public. No one has yet vouched for their economic feasibility, however, although it does not require much of a stretch of the imagination to foresee an increasingly extensive use of air conditioning, not only in office buildings but in transportation vehicles, apartment buildings and eventually in private homes.

Regarding air conditioning in passenger cars, a well known and influential railroad officer recently advanced the following statement and question: "I have not overlooked the experiments now being carried on to cool the air in diners and sleepers by artificial refrigeration, but it remains to be seen whether any one of these plans can be carried out without too great expense. In the meantime, you have a wide latitude in which to develop whether the conditions cannot be changed for the better without expensive mechanical means. For instance, is there any reason why the kitchen of a dining car cannot be so insulated and ventilated that while the passengers are standing in the corridor they will not be made uncomfortably hot, or so the passengers in the kitchen end of the dining car will not be less comfortable than those at the other end?"

Both natural and artificial forms of insulating material have been developed and put on the market within the past few years, and in the same period some of the greatest advances in sound proofing have also been made. Are the railroads making the greatest possible economic use of these new ideas and improved materials in their new passenger equipment to insulate it against heat, cold and noise? The answer is obvious. And yet the more thorough insulation, especially needed since the advent of the all-steel car, will have the added advantage of saving steam in winter, and the dampening of vibration and noise may well have a favorable effect on maintenance in more ways than one.

After insulating a car properly, the next requisite is adequate ventilation, and the same railroad officer says "It is still surprising that no car designers and builders have provided a system of ventilation that fully recognizes the movement of air; that is, hot air and cold air and that charged with the carbonic acid from the human breath."

It cannot be questioned that in many cases the addition of modern ventilators and electric fans will contribute greatly to the comfort of passenger travel, and in other cases, possibly the relocation of fans is all that is required to effect the desired improvement. The provision of easily operated windows with some device for keeping out dust has also been suggested, as highly desirable. A popular magazine with national reputation is reported as recently beginning an article with the statement: "Summer rail travel is rendered uncomfortable by heat, dust, cinders, smoke and noise." The imperative necessity of railroad men doing more than they have in the past to mitigate these conditions is apparent.

Next Year's Convention Programs

ON September 26 when the Traveling Engineer's Association adjourned its thirty-eighth annual meeting, the 1930 convention season came to an end. Considering the fact that this year has been one of business depression, the conventions of the associations in which mechanical-department officers and supervisors are interested have been very successful. Contrary to expectations, the attendance at the majority of the annual meetings has surpassed that of 1929, and the programs have been interesting and instructive.

Perhaps the success of the conventions this year can be attributed to extra efforts on the part of the association officers, who, realizing that the convention would be held under adverse conditions as compared with previous years, took more effective measures to plan an attractive program and to see that papers and committee reports were turned in on time. Undoubtedly more thought was given to the arranging

of a constructive program than has been the case for several years back.

Several mechanical-department associations have been severely criticized for the weakness of their convention programs in recent years. It has been advocated in several instances that certain associations be disbanded and their activities combined with or taken over by another association. One reason for this, has been the expense involved in connection with the exhibits of the supply manufacturer's associations which meet in conjunction with the railroad associations. An effort to correct this will be made next year when several of the associations will meet at the same time and place so that the exhibits for all the conventions can be combined. However, the fact that there has been considerable duplication in the programs of several associations, and at the same time a number of important developments have not been touched, has been one of the primary causes for criticism.

Much of the success of the convention program depends on the secretary. One reason for this is that the position of secretary is held by the same man year after year, while the occupants of other offices change each year. If an association is fortunate enough to elect a man with ideas and vision as president, it will, in all likelihood, have a strong program that year. However, in the long run, whether or not an association has a strong constructive program, largely depends on the efforts of the secretary.

There has been a tendency on the part of many associations to delay the planning of the next year's convention program too long after the last convention. One reason for this is perhaps the desire of the secretary to take a well-earned vacation after his strenuous work in preparing for the convention just closed. Usually, by the time action is started on the planning of the next year's program, what has been said and done at the last convention has been forgotten. Frequently subjects which have been discussed at the last convention and left hanging in the air, so to speak, are not carried on the agenda for the following year. The experienced planner of convention programs knows that there should be at least one controversial subject and one subject of general or human interest on the program. If some subject on the program just completed has aroused a live discussion, that subject is a good one to have on the first day's program of the next convention. Practically all of the mechanical-department associations have been guilty of overlooking this fundamental principle when they have laid out their annual convention programs.

The overlooking of subjects which have been discussed at the last convention and which need further consideration could be prevented and the program as a whole could be made more constructive and interesting if the committee responsible for the planning of the program for the following year were to meet at the close of each convention while the business just finished is still fresh in their minds. Duplication of effort on the part of several associations could also be prevented by an informal organization of association secretaries which could serve as a clearing house when the final plans for the programs are being considered.

Taken as a whole, the programs of the various conventions held during the year afford a good foundation on which to build programs for the future. Timeliness of the subject, quality of the material, and constructive handling in the preparation of the paper or committee report, will go a long way toward insuring the future success of the association and in attracting large numbers to its conventions.

NEW BOOKS

WELD DESIGN AND PRODUCTION. *By Robert E. Kinkead, consulting engineer. Published by the Ronald Press Company, 15 E. 26th street, New York. Price $4.*

The book incorporates basic information and fundamentals on welding. Chapters discuss the developments of welding, welding principles, the effect of physical conditions on weld behavior, actual welding conditions, welding procedure control, machine welding, research procedure and welding developments.

LOCOMOTIVE CYLCLOPEDIA. *Edited by Roy V. Wright and R. C. Augur, under the supervision of an Advisory Comimttee of the Mechanical Division of the A. R. A. Published by the Simmons-Boardman Publishing Company, 30 Church Street, New York. 1,440 pages, 9 in. by 12 in., over 3,400 illustrations. Price $5.00 in cloth, $7.00 in leather.*

In the ninth or 1930 edition of this well known reference book, the contents have been thoroughly revised. Old material has been omitted and a vast amount of new data and drawings have been added which materially increase the size of the book. In the general arrangement, with dictionary and 18 other sections, the grouping of the material is practically the same as in the previous edition. One new section has been added, however, on the closely connected subjects of lubrication and roller bearings. In subject material all types of locomotives—steam, electric, and internal combustion engine—are covered, and those for industrial as well as for railroad service are included, together with A. R. A. specifications and other data on current motive power and accessories. Easy reference to any device is secured by seven indexes in addition to those at the beginning of each section and the cross-references in the dictionary.

OXY-ACETYLENE WELDER'S HANDBOOK.—*By M. S. Henricks, editor, Acetylene Journal, 608 South Dearborn street, Chicago. 208 pages, illustrated, 4½ in. by 6½ in., flexible binding. Price $3.*

This working manual of instructions for oxy-acetylene welders covers clearly the fundamentals of oxy-acetylene welding. The important operating factors involved in welding are discussed principally from the standpoint of welding on steel, apparently because steel is the metal which is most commonly welded. The book, however, gives complete information regarding the correct technique for welding other ordinary metals, such as cast iron, aluminum, copper, brass, bronze, nickel. Monel metal and alloy steels, and much information of value is included on pipe welding, tank welding, aircraft welding, etc. A particularly interesting feature is the method of treatment of such subjects as the training of operators and the inspecting and testing of welds. These subjects make the volume a useful guide to welding supervisors and instructors and at the same time present the facts regarding welding to the beginner in such a way as to encourage him to become his own supervisor and critic. The subject of the design of welds is discussed in detail and is well illustrated. The conclusion of the chapter on testing welds is a discussion of all of the important factors involved in a complete welding operation. The book contains chapters on The Welding Gases; Welding Equipment; Setting Up Equipment; Methods of Welding; Preparation for Welding; Inspecting the Weld; Training Operators; Welding Properties of Common Metals; Testing, and Important Applications.

THE READER'S PAGE

Long Travel—Large Grates—Large Heating Surfaces?

LOUISVILLE, KY.

TO THE EDITOR:

The proportioning of those linkages known as the Young, Walschaert or Baker valve gears to cause 9-in. maximum travel, not because such travel is necessary for starting a train nor for slow drag work, but for the purpose of obtaining approximately 100-per cent increase in port opening at early cut-off, would not work out well if the grate area and heating surfaces were no greater in proportion to piston displacements than in designs of the eighties and nineties. English locomotives of the nineties having 19-in. by 26-in. cylinders and proportionately small grate surface had 4½-in. valve travel and were, for those times, light in the matter of fuel consumption.

The time for long travel was not until locomotives had long as well as wide fireboxes. I remember hearing a wise old engine runner say after hearing some roundhouse "Ciserois" talk *at* the subject of "Valve Mashun" in the nineties, "It has been my experience and observation that an engine with a big and good boiler usually has a good valve gear."

The long travel, large grate and heating surface are complimentary and this was known to men who were respected mechanical engineers long ago. These observations are those of one who, metaphorically, is beside the right-of-way watching the cars go by.

HARRY CORNELL.

Thin Journal Bearings

NEW HAVEN, CONN.

TO THE EDITOR:

In the August issue appears the question "How thin will a bearing become before it is apt to cause a hot box?" This question will no doubt result in a variety of answers. A.R.A. Rule 66 states, "That bearing worn through to brass shall be considered as requiring removal." This condition does not exist as a usual practice. When the lining gets thin, it spreads or cracks and will cause an overheated journal. However, this condition does exist sometimes and when such a condition is found the bearings should be removed whether or not the journal shows any signs of overheating.

There is a difference of opinion in regard to how much lining should be on a bearing before it should be replaced when the box is jacked up for any reason. In my opinion the rule should give a minimum thickness but, as it does not, it leaves the matter up to the judgment of the repairmen. If a periodical inspection is being made as per Rule 66, it must be taken into consideration that a bearing with a thin lining cannot be put back if found to be otherwise O. K. The rule also states to the effect that, if no other defects are found on bearings outside of a thin lining, they should be worn through to the brass before one could consider scrapping them. A journal bearing should be scrapped when the lining is so thin that in the judgment of the repairman it will not give nine or ten months further service.

It should not be necessary to have repairmen carry calipers as the rule is very specific in regard to scrapping journal bearings. This information plus a little good judgment is all that is necessary to decide when journal bearings should be removed. This is the only method that can be used until the A.R.A. sets a limit of wear on journal bearings. This I think should be done and incorporated in Rule 66.

J. W. MCDONNELL.

Two Questions

WORCESTER, MASS.

TO THE EDITOR:

Which is the B end of a car? The brake staff end or the end toward which the piston travels? On battleship coal cars you will note that the piston travels toward what is commonly called the A end of the car while the brake staff is on the same end on which the cylinder is mounted.

If the brakes on a car, which was made up in a train and which was being tested with ground air, released after each application, would the brakes on the same car hold if tested with a single-car testing device?

W. A. BURNHAM.

(A.R.A. interchange rule 14 states, "The end of the car toward which the cylinder push rod travels shall be known as B end and the opposite end shall be known as A end."—EDITOR.)

Variable Lead Attachment—A Question

COVINGTON, KY.

TO THE EDITOR:

An article appeared in the November, 1929, *Railway Mechanical Engineer,* page 683, which described a variable lead attachment for the Walschaert valve gear applied to a Denver & Rio Grande Western locomotive. A Walschaert gear with the variable-lead feature was applied to ten 4-8-4 type locomotives by the D. & R. G. W. which were described in the October, 1929 issue, page 621. This feature was first described by W. A. Franklin in the July, 1928 issue, of the *Railway Mechanical Engineer,* page 391.

Referring to the article in the November, 1929, issue, I have prepared the two sketches and a number of questions that I would like to have answered. Referring to Fig. 1., starting-power lever:

1—Can the starting-power lever be applied to all classes of steam power?
2—Can the starting-power lever be applied to all types of valve gears not having 9-in. valve travel?
3—Is the link radius determined from points 1 and 2?
4—Should point 1 be on a horizontal center line of the valve when the lever *A* is in an exact vertical position?

5—Give the names of the following: Lever *A*, lever *B* and bracket *C*.

6—Can the starting-power lever be used in conjunction with the variable-lead attachment, as described on page 683 of the November, 1929 issue? If so are the variable-lead-attachment details standard on all classes of power and with the starting-power lever arrangement?

7—If the variable-lead attachment can be used in conjunction with the starting-power lever, is the combination lever slotted or is lever *A* slotted?

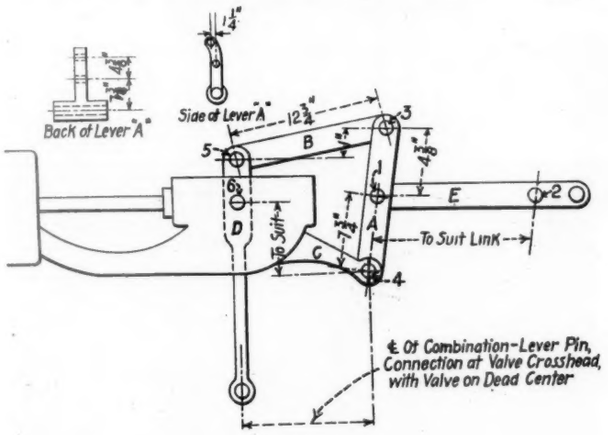


Fig. 1

8—Is the lifting lever used in the variable-lead attachment for variating the lead connected to radius bar *E*, at point 1, or lever *B*, at point 5?

The following is a series of questions, referring to Fig. 2, variable-lead attachment:

1—Is point *A* on the auxiliary-reach-rod arm always in line with points *B* and *C*?

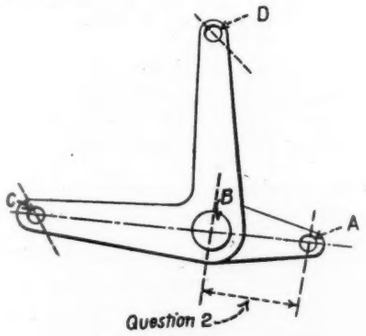


Fig. 2

2—What is the distance between points *A* and *B*?

3—Is point *A* on the auxiliary reach rod arm always in line with points *B* and *C* regardless of the distance between points *C* and *D*?

4—Can the variable-lead attachment be used when the tumbling shaft is located behind the link?

5—Can the variable-lead attachment be used with all types of valve gears?

6—Are the slotted dimensions in the upper end of the combination lever standard for all types of valve gear with which the variable-lead attachment is used?

7—Show on Fig. 1 the suggested position with all the necessary dimensions of the auxiliary-reach-rod arm when the tumbling shaft is located behind the link.

8—Has the variable-lead attachment any advantages as a coal and water saver? If so please show the difference in the performance record (October, 1929, issue, page 623) of this particular locomotive if not so equipped, or the approximate saving in coal and water per hour of any locomotive in general that is equipped with this device.

9—Is the variable-lead attachment free for anyone to manufacture and use to their advantage without infringing on any patent rights?

KENNETH E. KIPFER.

An Answer

DENVER, COLO.

TO THE EDITOR:

Replying to Mr. Kipfer's questions relative to the variable-lead. The answers are as follows:

7—Combination lever to be slotted.

8—Variable-lead attachment to be connected at point 5 of the radius bar.

Referring to the questions with special reference to the variable-lead attachment, replies are as follows:

1—Yes.

2—Depends on amount of variation required.

3—Yes.

4—Yes.

5—Can be used with any gear using a radius bar and combination lever.

6—Dimensions to suit the locomotive.

8—The device eliminates preadmission and allows longer lead at short cut-offs with consequent wider port.

9—Yes.

W. J. O'NEILL,
General Mechanical Superintendent,
Denver and Rio Grande Western.

Another Answer

ALBUQUERQUE, N. M.

TO THE EDITOR:

Answering Mr. Kipfer's questions on the starting-power lever:

1—Can be applied to any locomotive having the extension type of back valve head.

2—Yes.

3—Yes.

4—This point is not necessarily on the valve-center line.

5—Lever *A* is the starting-power lever, lever *B* is the starting-power-lever-union link, and *C* is cast integral with the back valve head and had no special name, being referred to as the extension or starting-power-lever fulcrum.

6—These two devices could be used together, but I do not believe it has ever been done. The details and proportions of both these attachments are not standard for different classes of power, but vary considerably, although the general design is the same.

7—See Mr. O'Neill's answer.

8—See Mr. O'Neill's answer.

I might add that the starting-power lever is designed with a slight offset. The top hole is set about 1¼ in. ahead of the center line of the other two holes so the upper arm of the lever will be at right angles to the starting power-lever-union link when the reverse lever is in the center of the quadrant and link block in mid gear.

Also, the starting lever is vertical when the link block of the Walschaert gear is in mid gear regardless of the position of the other parts. I understand that this feature has only been applied to engines equipped with a Walschaert gear. I am adding a rear view to Fig. 1 showing how the lower bearing is extended for some 12 in. for long wear. The measurements shown in Fig. 1 were taken from the Santa Fe 2-10-2 type, which was described in the July, 1928 issue.

I am unable to add anything to Mr. O'Neill's answers on variable leads, as I have had no experience with this attachment. It is described in some books on valve motion, one of which is "Modern Locomotive Valves and Valve Gears" by Charles L. McShane.

W. A. FRANKLIN.

STEAM RAIL COACHES in suburban service are being tried out by the Nanking-Shanghai railway (China), according to Department of Commerce reports. Six new coaches, each providing first and third class passenger accommodations, will make a total of 74 trips daily at 25-min. intervals between Shanghai and North and Woosung Forts stations.

With the Car Foremen and Inspectors

*Modern Equipment for the Paint Shop**

IN the application of nitrocellulose (lacquer) and other finishes, adequate ventilating facilities are of paramount importance, not to protect the health and working efficiency of employees alone, but to eliminate the fire hazard and dangers of explosion incident to the application of these very desirable finishes. To produce ideal working conditions while spraying, it is necessary to install a ventilating system that will insure from three to four changes of air per minute in the spraying enclosure. In view of this fact, it will be readily understood that, from an economical standpoint, it is essential that the spraying enclosure be as small as possible, hence, the spray booth.

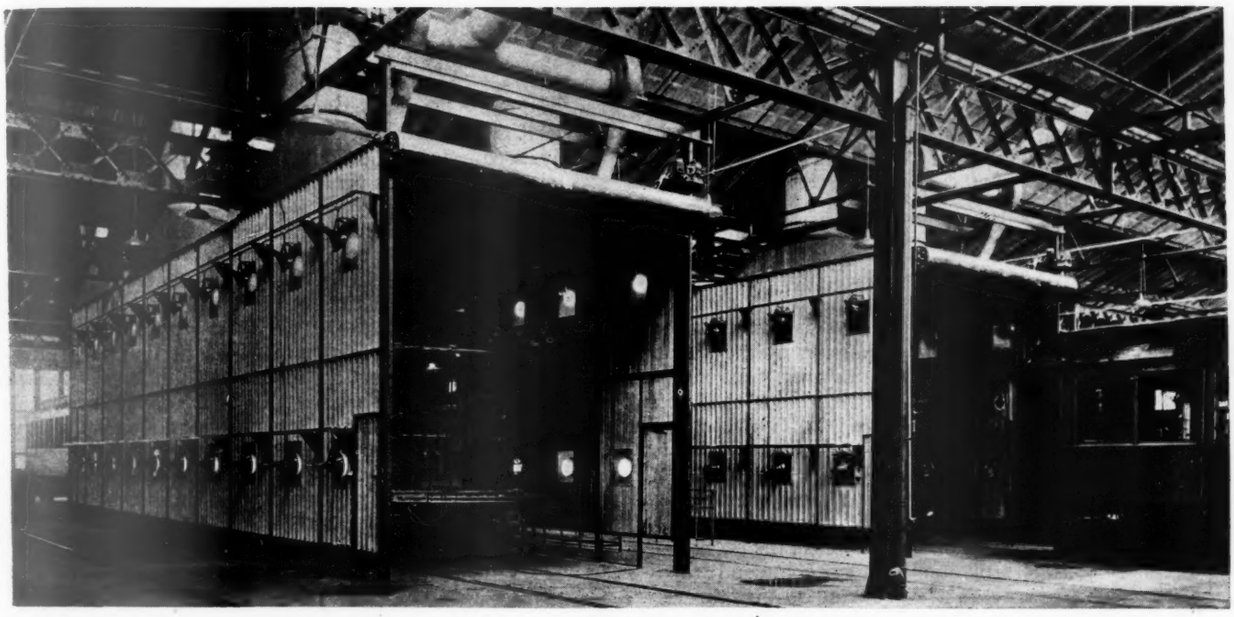
The accompanying photographs will give a general idea of the tunnel-type spray booth, already in operation in some railroad shops. These booths are especially designed to provide just enough room around the car or locomotive to allow freedom for the workmen. They are completely enclosed with the exception of an air intake space of approximately nine inches between the booth wall and the floor. The walls of the booth are fitted with glass panels through which strong lights, located outside the spray booth, provide ample illumination for the workmen inside. The ends of these tunnel type booths are equipped with power-driven rolling steel doors, which are closed after the car enters. A small service door is provided at each corner of the booth for emergency exit.

Suction is maintained by six or eight (depending on the size of the booth) venturi exhaust stacks, each capable of exhausting 600 per cent more air through the stack than actually passes through the fan. This is accomplished by co-ordination of a high-pressure jet in the venturi throat of the exhaust stack. The air from

Interior of the sand blast at Russell on the Chesapeake & Ohio

Sand-blast installation at Russell, Ky.

* Abstract of report of Committee on Shop Construction and Equipment presented at the annual meeting of the Equipment Painting Section, A. R. A., Chicago, September 9 to 11, 1930.



Spray booths of the Chicago Rapid Transit Company at Niles Center, Ill.

the fan discharged through the high pressure jet, creates a vacuum in the stack below the venturi throat. In this arrangement, the fan and motor are located outside the line of exhaust, and usually outside of the building. When fans and motors are located inside the building, air for the fans is induced from the outside through a duct to each fan, in order that heat losses in the building may be minimized as far as possible. The lacquer-laden exhaust fumes never come in contact with the fan or motor—a feature that eliminates any possibility of fire or explosion from motor sparks or fan friction, and also insures 100 per cent fan efficiency at all times.

In installations of this type, workmen can operate any number of spray guns on both sides of a car at the same time, the suction draft being so arranged that the operators breathe clean, fresh air while working inside of the booth.

The price of spray-booth equipment would depend somewhat upon the construction of the building in which the equipment is to be installed. However, the price will range between $9,000 and $10,000 for a booth approximately 100 ft. long. This price includes all sheet-metal work, fans, motors, ventilating stacks, lights and electrically operated rolling steel doors. To this price it would be necessary to add the cost of sprinkler equipment and erection labor.

The Pullman Car & Manufacturing Company Installs a Novel Spray Ventilating System

The rapid development in the use of lacquers by the automotive industry was followed about seven years ago by a conscientious effort on the part of a number of lacquer manufacturers to adapt their products for application in the railway-car field. The initial experiments undertaken by them, both in the car-building and railway repair shops, were not wholly successful, but the progressive shop painter soon found time to ponder over the addition of the spray-gun method for applying lacquer and paints. The conservative master-car painter saw many new problems opening up, and the management, because of a number of disastrous fires, magnified the property and personal hazards involved. This reluctance on the part of the railroads to accept a new product not yet developed to their own requirements kept the demand for spray work at a minimum and these early experimental days likewise reflected an unwillingness on the part of the management to assume risks to their plant equipment.

It was then determined to make a careful and thorough investigation of all the ventilating systems which we might adapt to our own position as a progressive and economical manufacturer of car equipment. A committee consisting of the manager, superintendent, plant engineer and paint foreman, collaborated in studying from a practical viewpoint all installations thus far developed. They found that there were three types of ventilating systems available for observation, first, the tunnel or permanent booth, second, the stationary-frame canopy and third, the portable canopy. Each of these is described in the *Railway Mechanical Engineer* of June, 1929.

None of these three types had incorporated pre-heated air and this was regarded as a prime essential to an economical wintertime ventilating installation. Middle West temperatures frequently drop to zero and our plant engineer worked in designing the layout as arranged to compensate for this outside minimum temperature. Our previous practical experience had demonstrated that a forced draft equivalent to moderate outdoor ventilation would be sufficient to maintain favorable working conditions within the shop. Our plant engineer, working with these fundamentals, modeled the present layout.

Two sections of a centralized shop having stall capacity for six and four cars respectively were selected. The location provided has bricked-in walls extending from the floor to the roof with large swinging doors at each end to allow for the ingress and egress of cars from the transfer tables. The diagram attached shows the approximate layout of the apparatus in conjunction with the ventilating system. Motors and accessory equipment are suspended from the roof. Fresh air is drawn in from the outside through a 30-in. intake. This air is then passed through enclosed unit-type fin-pipe copper-tubing heaters suspended from the shop ceiling. The preheated air is then transmitted by the aid of two 7½-hp. motor-driven low-pressure Sirocco blowers through

ducts into a heated exhaust system. The discharge is through large galvanized ducts ranging in diameter from twelve inches to twenty-four inches, running parallel to each side of the car frames with a horizontal discharge at the end. The fumes rise naturally with the preheated air. At 20 deg. F. outside temperature, the cold air taken in will be raised to 120 deg. F. at the discharge points. At 0 deg. F. outside temperature the air at the discharge points will be 90 deg. F. In general the velocity of the air at these outlet points ranges from 2,500 to 3,200 ft. per min., tapering off as the far end of the car is reached. The warm air from the forced horizontal discharge tends to cause the fumes to rise to the extreme ends of the shop where louvres built in over the doors assist in the natural expulsion of the vapors. The horizontal draft gives a complete change of air per car length four times per minute, assuring a constantly fresh-air supply parallel to the car side. The volume of air per car per minute is equivalent to 10,000 cu. ft., or a total of 40,000 cu. ft. per four-car section. Over a nine months' period of daily operations no accumulation of paint residue can be found within the shop.

To those interested in shop maintenance, the economies of this installation will immediately commend themselves. Separate switches are provided so that the ventilating system can be operated independently for each stall with a consequent saving in power. The extra cost required to heat this four-car section at 0 deg. F. outside temperature, is estimated at 80 cents per hour; at 30 deg. F. outside temperature, 50 cents per hr.; at 50 deg. F., 30 cents per hr. During the last severe winter spell when the official readings fell well below zero, we found that this section, because of its forced draft of hot air, was even more comfortable than our newer shops.

Proper Housing of Freight Cars While Being Painted

In continuing the subject of the housing of freight cars (particularly box cars), your committee feels as they did last year, that the painting of these cars should be done under cover, and not outside in the open air where they are subject to all of the elements, which retards production, and causes a more rapid deterioration of the material applied.

Through the co-operation of L. B. Jenson, passenger shop superintendent, Chicago, Milwaukee, St. Paul & Pacific, we have received the following information, and photographs of the new $1,000,000 plant at Milwaukee. Wis.

"The advantages of indoor painting:"

1—Affords better working conditions and facilities.
2—Is cheaper and more efficient.
3—Better drying conditions are obtained.
4—Painting is not affected by outside weather conditions.
5—Paint applied on the cars is more durable.

Milwaukee Shops of the Chicago, Milwaukee, St. Paul & Pacific

New Freight Car Repair Shop—About February 15 of this year, freight car repair work was started in the new million dollar shop, built by the Chicago, Milwaukee, St. Paul & Pacific at its Milwaukee Shops. This new shop is 1,000 ft. long by 196 ft. wide, and is one of the largest and best equipped freight car shops in the country.

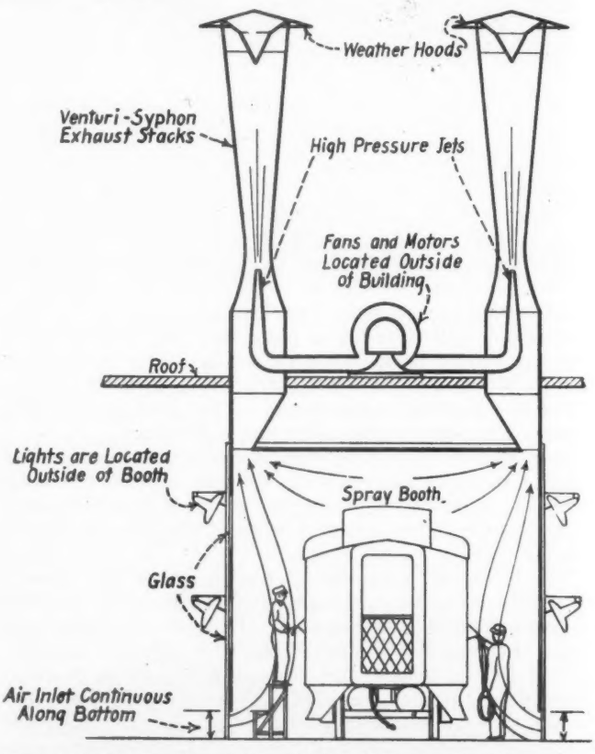
This repair work, including the painting and stencilling, is done on the cars while they are within the shop buildings. All painting and stencilling is therefore done under cover.

Method of Handling the Repair Work—The system of repairs described herein refers only to heavy repair box cars. To facilitate description, the study will be confined to two repair tracks.

The shop employs the production system, or so-called station-to-station plan for repairing cars. The cars to be repaired enter the shop at the north doors and are moved forward at set intervals until they leave the shop, completely repaired, at the south exits. At each shop, or station, certain work is performed. The last two stations are assigned to painting and stencilling.

Two repair tracks are considered and treated as being one unit. The present schedule assigns an output of ten cars per day to the unit. This means that each of the two repair tracks must turn out five cars daily. During an eight-hour working day each car remains at each station for a period of 96 min. (Eight hours divided by five cars.) However, the movement on the two tracks alternates so that one of the tracks is moved forward every 48 min. A car, ready for spraying, is delivered to the painting station every 48 min.

Work at Painting Station—Each car receives two full coats of paint, a priming coat and a finishing coat. Both coats are sprayed.



Spray booths at the shops of the Chicago Rapid Transit Company at Niles Center

When a car is moved to the painting station on track No. 1 the priming coat is immediately sprayed on, and the car left to dry. Forty-eight minutes after the first car was spotted on track No. 1, the second car is moved onto track No. 2 of the painting station and receives its priming coat. Then the first car on track No. 1 is given its second or finishing coat, and is ready for movement to the last station where it is stencilled.

The men who spray a car stand practically in one spot, one man on each side of the car, and spray paint on the ends and sides of the car while it creeps slowly forward. Then, to paint the car roof, the men stand on an elevated platform, and the car is pulled slowly backward.

Time Required for Painting—A car receives its first

coat of paint when it first arrives at the station, and its second coat about 48 min. later. For each coat, it requires two sprayers seven minutes each to paint the sides and ends of a box car, and seven minutes each to paint the roof. The total actual manhour time required to spray one coat on a car is therefore 28 min., or 56 min. for two coats, the completed job. The sides and ends of the car are sprayed first and the roof last.

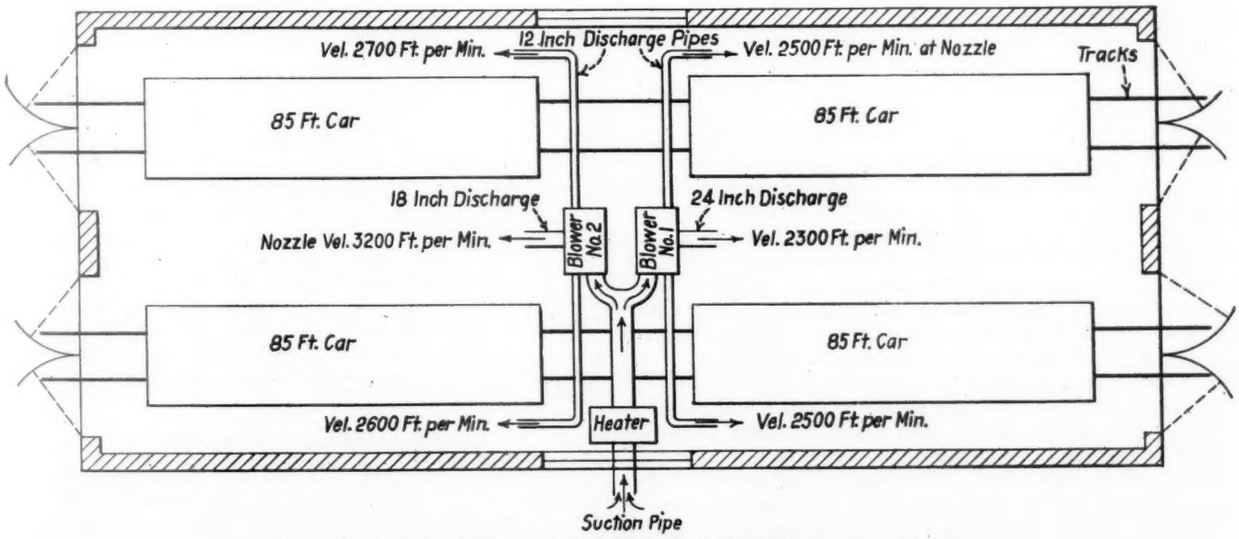
The time allowed for drying between coats is about 34 min., that is, the difference between 48 min. and the 14 min. required for spraying.

Material Used—The paint used contains treated linseed oil and is commonly known as the four-hour-coating or two-coat-per-day paint. It is one of the many improved freight car paints now on the market, that are furnished by several of the larger manufacturers who specialize in this class of material. Between seven and eight gallons are required to give a car two coats. The same kind of paint is used for both the priming and finishing coat.

Stencilling—The cars are stencilled at the last station before they leave shop. The stencilling work is done by hand in the ordinary way, and requires no further explanation. Cars are painted today and stencilled tomorrow afternoon, thus allowing the paint time to set up and dry.

Supervision—The painting and stencilling are under the supervision of a painter foreman.

Paint Spraying Outfit—Each track of the painting station is covered with a stationary, canopy type of exhaust. The car to be sprayed is run under this canopy.



Spray shop of the Pullman Car & Manufacturing Company at Chicago

Currents of air which flow closely to the sides of the car from floor slots, force all fumes and odors upward into the canopy where exhaust fans carry them off. The painting station is not partitioned off from the rest of the shop.

To facilitate the spraying of car roofs, a stationary elevated platform, or walk, extends clear across both tracks at the end of the canopies.

Each track has two sets of spraying outfits, one on each side of the track. The spray guns are six feet long and thus the use of scaffolds is unnecessary when the sides and ends of the cars are painted. The pressure feed paint tanks are portable and have a capacity of 12 gal.

Chesapeake & Ohio Shop at Russell, Ky.

In connection with the painting of freight cars, G. B. Blanchard of the Chesapeake & Ohio, writes as follows:

"Before our new freight car shop was built, we always painted our cars in the open. It was certainly a job then, especially in the winter months, paint would not dry and some days we could not paint at all. Now the coldest days we have no stops on account of bad weather. Cars are dry when painted and dry when ready for the shipping track. In spraying out of doors on a bad windy day, the loss of material was quite an item, and production was held up.

"Our new shop is equipped with suction fans in the top of the building, and ventilators in the skylights. In the winter months, the shop is heated with hot air fans, placed about every 20 ft. apart, along both sides of the entire shop, by which an even temperature is procured, and production and good workmanship is assured.

"We use the spray method mostly after the cars are turned over to us. They come from the repair shop and are set in the paint shop. We have five tracks in the paint shop which extend the entire length of the building. Cars receive two coats of black or brown and are stencilled the third day. It is worked so we spray on one track while we are stencilling on the one second-coated the day before, then the next day we will stencil the other track. So you see the cars remain on the same track until finished and ready for service."

Sand-Blasting Steel Cars

The following is about the most outstanding question on this subject presented: What advantage is obtained (considering the expense of constructing a suitable building) from doing this work in a regular building provided for that purpose?

Would it not answer every purpose and be better from a standpoint of health if this work was done under an open shed?

Instead of attempting to come to a positive decision on this important subject your committee has elected to gather certain information bearing on both methods, and then present them here for your consideration.

Following is a description of two different methods of blasting steel cars, one of which is done out in the open shed, "using sand." The other method of blasting cars is done inside of a building especially constructed for the purpose. Steel grit is used instead of sand.

In answer to a letter written to H. B. Weisgarber, foreman painter, Southern, Spartanburg, S. C., asking

for a complete description of his system of sand-blasting, we received the following information:

"To begin with—I have a shop-made sand-blasting machine and I feel that the report I make will probably be a back number in comparison with some of the modern and up-to-date sand-blasting outfits used by other railroads and car manufacturers.

"It is impossible to give accurate cost per square foot of sanding painted surfaces due to the fact that all surfaces will not sand alike—neither will all operators work alike, so the figures I give you will be approximately fair to quote.

"Our standard steel cars contain about 1,200 sq. ft. of surface to be sanded and under ordinary conditions it will take one man and his helper seven hours to sand a car of this type. Our mechanics make 80 cents per hour and the helper 56 cents per hour—this is a cost of $9.52 for labor—it will take approximately 1½ tons of sand to sand this car. We use a hard flint sand furnished by the Ottowah Silica Sand Company, Ottowah, Ill. The sand costs us $3.50 per ton at the pit and $3.40 freight to our shop—this makes a total cost of $10.35 for the sand.

"Our shop engineer tells me it will cost $17.50 to manufacture air to operate the sand-blasting machine for a period of seven hours, using the one-half inch orifice. We also figure it will cost approximately $3.00 for fittings that wear out and tear on the hose and machine for a period of seven hours, making a total of $40.37 for labor, material, air, and upkeep, or a fraction over 3⅓ cents per square foot.

"These figures do not include preparing the car for the sand-blast, nor the cleaning out after completing the sand-blasting.

"To get best results you must be able to maintain a pressure of not less than 90 lb. of air at your sand machine. To do this you must have pressure tanks sufficiently large to hold this pressure while sanding. It is about ¼ mile from the air compressor to my sand house. I have a two-inch air line leading from the compressor to the sand house and have eight storage tanks, 70 in. long and 24 in. in diameter at the sand house that holds up my pressure. These tanks are placed at each end of the sand house and are so equipped that the water can be drained from the tanks before it reaches the sand—this is important as you must keep the sand dry.

"Our sand house is 90 ft. long, 15 ft. wide and about 25 ft. high. It is a wooden frame structure with a gable roof and lined inside with sheet metal 15 ft. up from the floor. The floor is concreted and we have a metal scaffold on each side that can be lowered or raised at the convenience of the operator. This building also has a space of six feet which is left open at the top that the dust may escape.

"We have a sand machine on each side of the car with a capacity of ½ ton of sand. We keep these machines near the center of the building, so as to avoid moving them around and in this way we are able to sand the entire car without making a move. We use regular sand-blasting hose with a one-half inch pipe about ten inches long on the end. I consider this sanding outfit ideal for a small shop and can be installed at a very small cost."

A similar letter as that sent to Mr. Weisgarber was also sent to Mr. Blanchard, whose reply follows:

"You ask what advantage is obtained doing this work of blasting in a regular building provided for that purpose, or in an open shed from the standpoint of health.

"Our building protects the car or locomotive from all dampness, especially in bad weather, it is as dry as in good weather; we have very little dust from the steel grit. Hence, it is not injurious to one's health. We have never used sand in our new building. From a health standpoint, if we used sand I believe it would be quite different from steel grit, probably it would not be so healthy.

"The building in which we do our blasting is 102 ft. long and the width inside of main blast room is 20 ft. 6 in. It has outside hallways on each side of the building. These are filled automatically with steel grit which falls in the pit in the main blast room when they are blasting cars. Six men could be used at one time, if necessary. On the outside, we have an overhead fan house where all the dirt and dust is carried out of the blast house and is loaded into cars underneath. All is electrically operated and has been giving good service.

"We use No. 50 grit in blasting. This we find is much faster, cuts quicker and has sharp angles to it, where sand has only round surface. Grit does not mash or crumble up like sand. Again in using the steel you get away from all the dust there is in sand, and you can keep on using it over and over again until it is entirely worn out.

"Care must be taken that the workmen be compelled to use a hood over their heads to prevent steel grit getting into the eyes.

"As to the difference in cost of using grit against sand: In the old way we used sand out of doors with portable machines. To sand-blast a 70 ft. passenger car, which had been painted several times, cost per car, labor and material, etc., as follows:

2,880 lb., of sand, at $3.50 per ton	$ 5.04
Cost of freight for sand, at 60 cents per ton	.86
Cost of air	11.59
Cost of labor, one helper, 19 hours (at 57 cents per hour)	10.83
Cost of labor, one laborer, 19 hours (at 40 cents per hour)	7.60
Total cost	$35.92

New method using steel grit in the blast house:

143 lb. grit, at $90.00 per ton	$ 6.43
Cost of freight, at $2.40 per ton, net	.17
Cost of electric current eight hours	3.80
Cost of air	4.89
Cost of labor, one helper, eight hours, at 57 cents per hour	4.56
Cost of labor, one helper, two hours, blowing out and off after blasting	1.14
Total cost	$20.99

"Besides being a labor saver, it does much nicer and cleaner work, especially on old boilers, fire boxes, etc. The steel grit seems to go after the surfaces much quicker and cuts much faster than the sand. The estimated cost of our new equipment complete was about $65,278."

Remarks of Committee

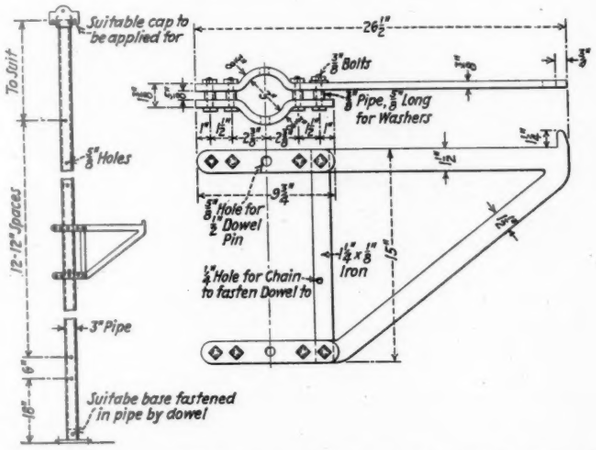
We note from Mr. Blanchard's letter that the air pressure while sand-blasting on the outside was only 70 lb. This may account for the difference in his labor cost, over that of Mr. Weisgarber's, who states that they had a 90-lb. pressure at his plant.

The report was signed by F. Clement, (*Chairman*, American Car & Foundry Co.); A. C. Boyle, (N. Y., N. H. & H.); C. E. Ream, (Penna.); W. F. James, (A. C. L.); S. H. Rauenzahn, (Reading); J. W. Geddes, (Pullman Car & Manufacturing Company); J. T. MacLean, (B. & M.), and H. Newman, (N. Y. C.).

The Delaware, Lackawanna & Western announces the introduction of coaches on some of its through trains in which there are four tables, one on each side, at each end, which can be used by parties of passengers desiring to eat their luncheons together; passengers may bring their own food or may buy sandwiches, pie and coffee from dining car waiters who will pass through the train. The tables are 38 in. square and are termed "permanent." They are to be provided in smoking cars as well as other coaches. At other than meal times, the tables will be available for use as card and writing tables.

Column and Bracket for the Paint Shop

THE column and bracket shown in the drawing is used in the paint shop of an eastern road. The column is a 3-in. pipe, supported at either end with a cap and base of malleable or cast iron. The variety of applications for scaffold columns in a shop, made it impracticable to design a cap or base which would suit all conditions. The cap shown can be applied to the side



A substantial scaffold support which can be easily adjusted

of a cross beam or steel roof member. The base shown is for a concrete floor. The column is drilled with ⅝-in. dowel holes, spaced 12 in. apart.

The bracket is made in the smith shop from 1½-in. by ⅜-in. bar. It is attached to the column by means of a U-clamp secured by ⅜-in. bolts. The feature of the column and bracket arrangement is that it can be easily adjusted and will not bind.

Decisions of Arbitration Cases

(The Arbitration Committee of the A.R.A. Mechanical Division is called upon to render decisions on a large number of questions and controversies which are submitted from time to time. As these matters are of interest not only to railroad officers but also to car inspectors and others, the Railway Mechanical Engineer will print abstracts of decisions as rendered.)

Coupler Claimed Missing

The Trinity & Brazos Valley applied one new 5-in. by 7-in. by 6½-in. Type D coupler complete on Houston & Texas Central car 3337, on account of a coupler of this size being pulled out in the yard, and rendered a material charge of $6.06 against the owner for the difference between the new 5-in. by 7-in. Type D coupler applied complete and the 5-in. by 7-in. Type D coupler pulled out in the yard credited as S.H. The Texas & New Orleans contended that, since the coupler in this case was pulled out in the train yard and did not accompany the car to the repair track, it was a lost or missing coupler in accordance with the intent of A.R.A. Rule 95. The repairing line stated that the coupler was pulled out in the train yard adjacent to the repair track and that the inspector made a notation on the bad-order card to the effect that the coupler yoke was broken, but that the coupler was in good order. It contended that since the whereabouts and the condition of the old coupler was definitely known, it was not a lost coupler in the sense of Rule 95.

In rendering a decision the Arbitration Committee stated: It is noted coupler pulled out, in good condition, evidently due to breakage of the riveted yoke, as confirmed by actual inspection of same. In such circumstance the coupler was not lost within the intent of Rule 95. Charge for coupler applied is in accordance with Rule 104, third paragraph.

This decision should not be misconstrued to permit charge for the draft springs and followers (when involved in such cases) unless they are defective. *Case 1640—Trinity & Brazos Valley vs. Texas & New Orleans.*

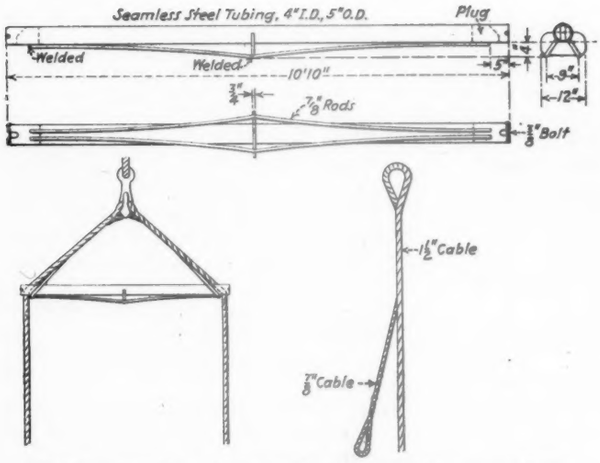
Adjustment of Lading

The chief joint inspector at Shreveport, La., issued an adjustment of lading authority against the Kansas City Southern on nine cars delivered to the Texas & Pacific loaded with oats, straw, meal and feed because the lading shifted against the doors, causing them to bulge. The T. & P. applied inside door protection, claiming that it was necessary, and charged the K.C.S. with its application. The K.C.S. declined to honor the bills stating that it switched the cars from the Shreveport Mill & Elevator Company to the T. & P. connection at Shreveport and claimed that in effect the T. & P. was the originating road and it was only acting as an agent for the road-haul carrier and should not assume the expense of furnishing inside door protection. The T. & P. contended that Rule 2 and Loading Rule 34, justified its charge against the K.C.S. as the delivering line for the application of inside door protection.

In rendering its decision the Arbitration Committee stated "The contention of the Texas & Pacific that inside door protection was required in these cases is sustained." *Case No. 1644—Texas & Pacific vs. Kansas City Southern.*

Cable Spreader for the Wrecking Crane

A CABLE spreader designed to prevent the wrecking crane from forming an inverted V and crushing the sides of the car while it is being raised, is shown in the drawing. The device is light enough to be lifted by hand, but strong enough to carry a heavy load. It is made of 4-in. by 10-ft. 10-in. seamless-steel tubing with iron plugs welded in the ends. These are used to distribute the pressure evenly on the tube and to eliminate the possibility of sharp edges wearing on the cable. A wood filler turned to fit the tube is used to strengthen the spreader. A 1½-in. cable is used to carry the load and a ⅞-in. cable is woven into the larger cable and looped. The loops of the smaller cable are set against two ⅞-in. rods which are welded to the



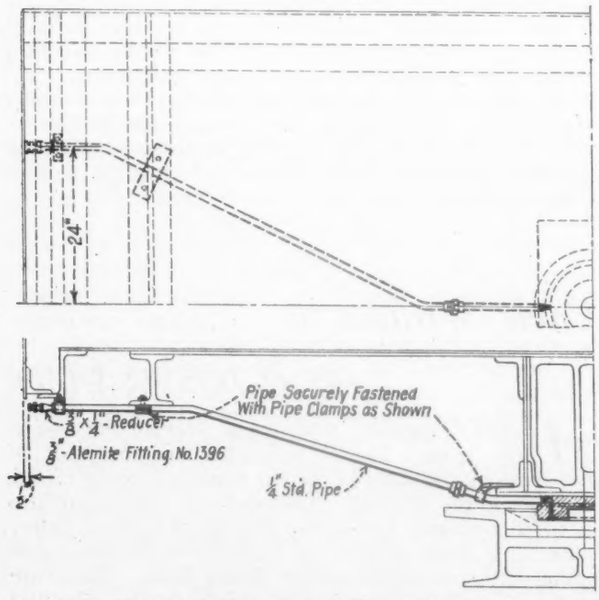
Cable spreader which facilitates wrecking operations

under side of the tube. Thus, the small cable is used to carry the spreader when setting the large cable under the load and to keep it in position as the pressure of the load is applied.

Pressure Lubrication for Passenger-Car Center Plates

BECAUSE squeaks, grinds and rattles are most annoying to those riding passenger cars it is essential that they be given some special attention and that they be eliminated wherever possible.

Lubrication will, in the majority of cases, remedy this condition. It can be applied easily to side bearings,



Location of alloy fitting for greasing passenger-car center plates

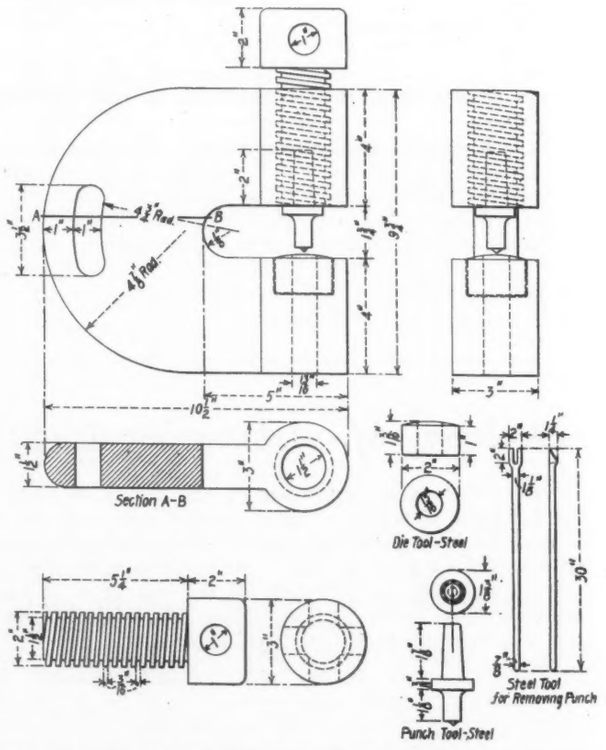
friction plates, pedestal guides, buffer stems and carrier irons and does not necessitate jacking up the car. However the lubrication of body and truck center plates requires that the body of the car be raised sufficiently to apply oil or graphite in the truck center plate and it is a costly operation, especially when it is necessary to lubricate a large number of passenger cars operating in daily service.

In the illustration is shown a sketch of a pipe arrangement for the lubrication of body center plates on passenger cars and which is provided with a 3/8-in. Alemite fitting. The pipe is securely fastened with pipe clamps as shown and extends from the center plate to a point about 24 in. from the center of the car at the side sill or angle.

This arrangement can be applied to passenger cars as they pass through the shops for general repairs or the cars can be placed on repair tracks where center plates can be removed, machined and drilled for application.

Flange Punch for the Freight-Car Repair Shop

THE flange punch shown in the drawing is used by an eastern railroad for punching holes in the end and corner posts on 50-ton hopper cars when applying



Flange punch for punching holes in the end and corner posts of hopper cars

standard safety appliances. The frame is 3 in. wide and allows a clearance of 1½ in. from the center of the hole to the inside of the car or any other obstruction. It is operated by means of a power screw. A 1-in. hole is drilled through the head of the screw through which a 7/8-in. bar is inserted for turning. This bar, the design of which is shown in the lower right-hand corner of the drawing, is also used as a tool for removing the punch.

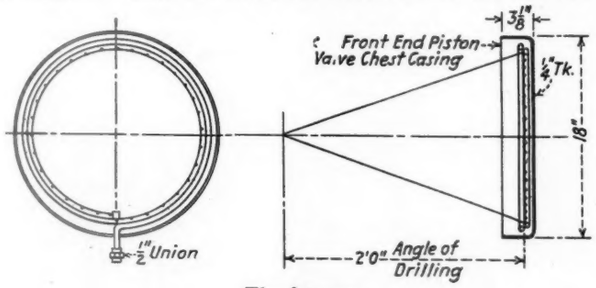
In the

Back Shop and Enginehouse

Thawing Device for Ash Pans

WINTER weather frequently makes it difficult to dump ash pans on account of ice forming in the bottom of the pan which melts from the heat of the hot ashes and then freezes as the ashes cool. Dumping ash pans which have frozen up is a mean job for the ash-pit forces at engine terminals and frequently is the cause of delay in getting a locomotive turned.

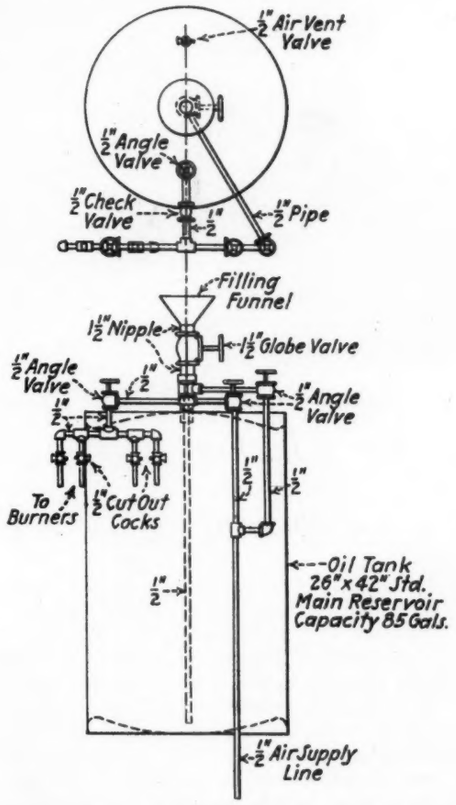
The thawing device shown in the three drawings is used on an eastern road at its engine terminals to eliminate such difficulty. The fuel oil reservoir is made from a standard main air-brake reservoir and is set on a concrete base as shown. Air pressure from the shop line is used to force oil from the reservoir to the burners



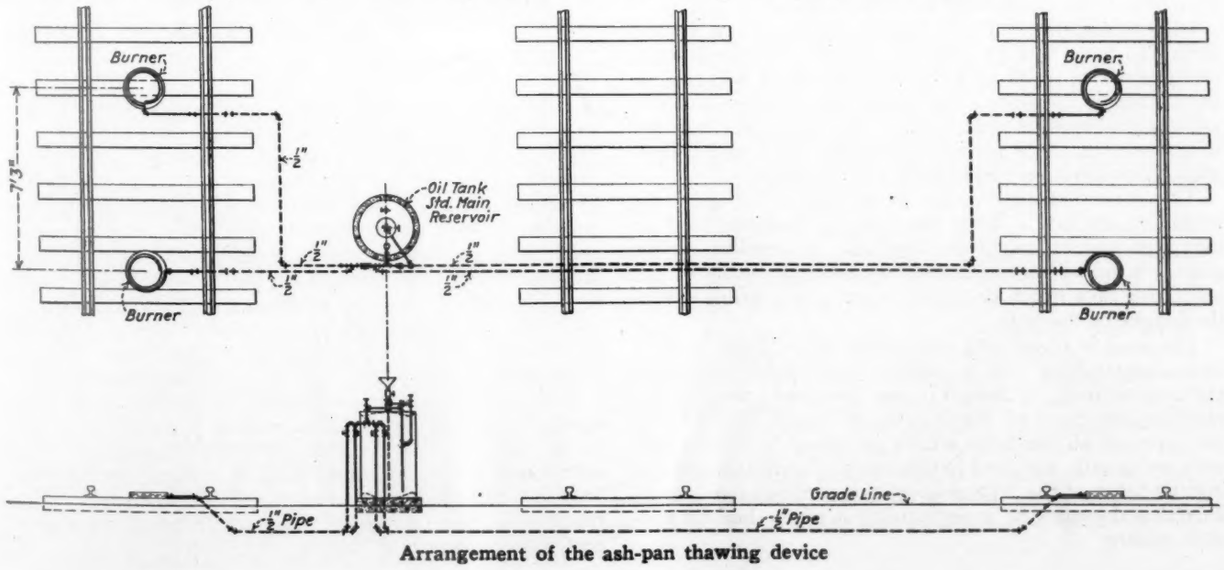
The burner

which are located in the center of the ash-pit tracks. Two burners, which are placed 7 ft. 3 in. apart, center to center, are provided for each track.

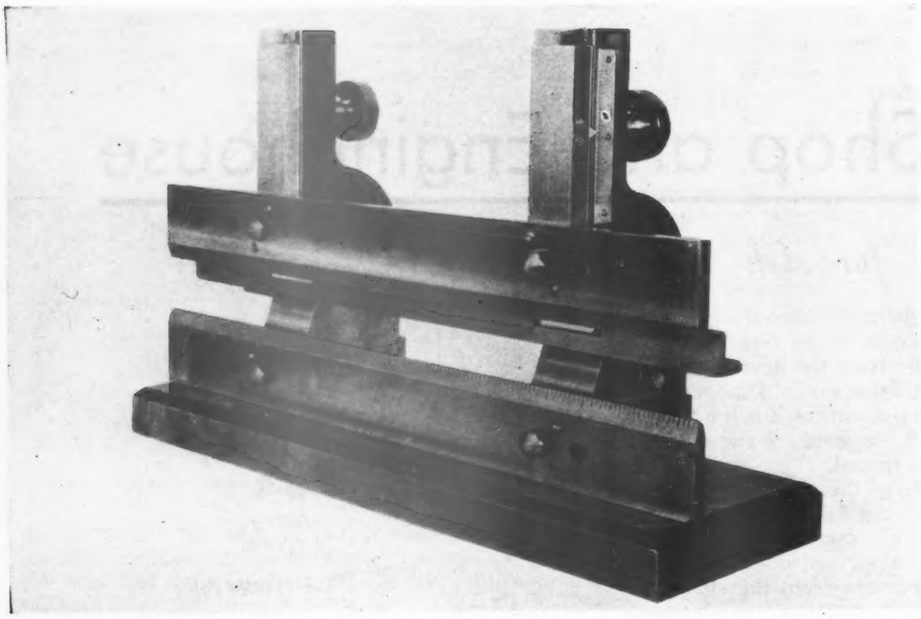
The burner consists of two coils of ½-in. pipe arranged as shown in one of the drawings. The smaller of the two coils serves as the burner and is drilled with 1/16 in. holes spaced approximately 1½ in. apart around the entire circumference. The burner coil is placed on the bottom so that the flame will heat the upper coil and thus cause the oil from the supply pipe to flow freely to the burner. The burner sets inside of a scrap front-end casing of a piston-valve chest.



Arrangement of the piping for the fuel-oil reservoir



Arrangement of the ash-pan thawing device



The gage to the left checks, the taper, the length and the diameter under the head of the bolt

Gage for Checking Taper of Frame Bolts

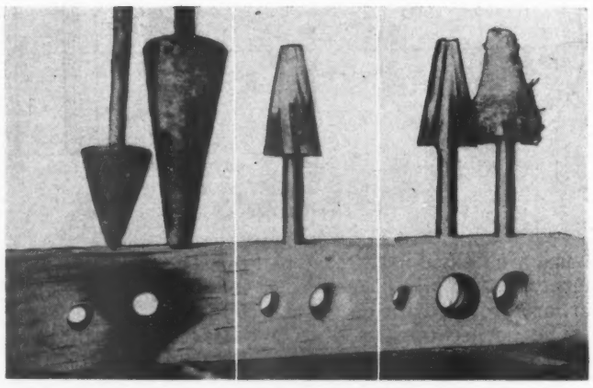
A GAGE for checking the taper of locomotive-frame bolts is shown in the illustration. The base of the gage is a steel plate 1 in. thick by 6½ in. wide by 18 in. long on which two columns are mounted. One straight edge is screwed and doweled against the base of the columns. Another straight edge, set to maintain $\frac{1}{16}$-in. taper to the foot, is mounted on vees which slide up and down in ways on the columns. A knurled nut, counterbored to receive a coil spring, is screwed on a stud which passes through slots in the ways on the columns.

When the nut is loosened, spring tension keeps the vees tight in the ways. As the taper of a bolt is checked, the diameter under the head of the bolt is registered at the same time by a pointer and a scale attached to the right-hand vee and column.

In checking the bolts of various diameters, it is necessary to have a third point of contact for the bolts to rest against in order that the straight edges will rest on the center of the bolts. An angle iron is riveted to two adjustable brackets just back of the straight edges for this purpose. It is possible with this gage and a light placed behind it to check bolts very rapidly.

The lower straight edge is graduated to give the length of the bolt. Bolts from ¾ in. diameter to 3 in. diameter and up to 18 in. long can be checked on the gage. A set of feelers is used as another means of determining how much the taper is out at any point within the length of the bolt.

The gage is 18-in. long and stands 12-in. high. It is of light construction and is readily transferable from one place to another. Although it was designed primarily for checking the taper of frame bolts it is used for checking the taper of all the bolts which are fitted by apprentices who are usually assigned to this work. Aside from checking the taper of the bolts it gives the apprentice an assurance that the work he is performing is of the highest possible calibre.



The metal cone, the fluted cutter and the one-flute cutting tool—The latter is wound with steel wool to burnish the hole

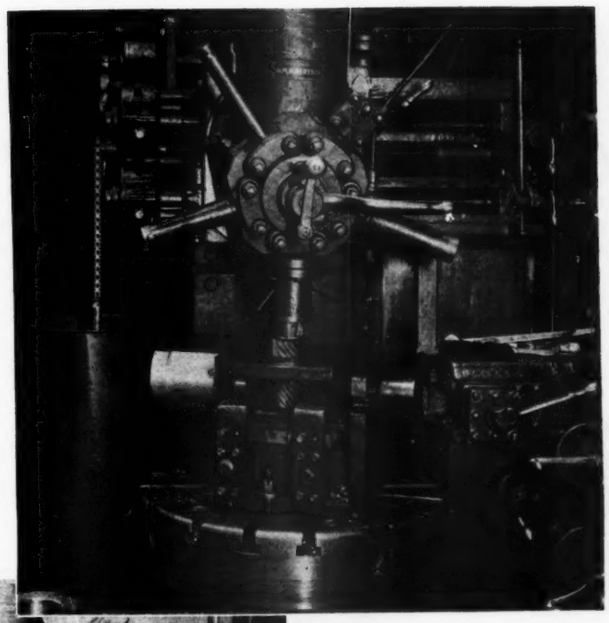
Boring Tapered Holes in Rosebud-Grate Patterns

IN the pattern shop of the Denver & Rio Grande Western at Denver, Colo., considerable trouble was encountered in evolving a satisfactory method for boring holes in patterns of rosebud grates. The holes which number from 200 to 250 in each grate are ½ in. in diameter at the top and about 1 in. in diameter at the bottom. They were burned originally with a metal cone after drilling a lead hole with a ½ in. bit. This method charred the surface of the hole making it unfit to hold shellac. Also, the burners deteriorated rapidly as it was necessary to heat them in a forge. A fluted bit was then tried and abandoned. This cutter choked and made a rough hole which was not satisfactory.

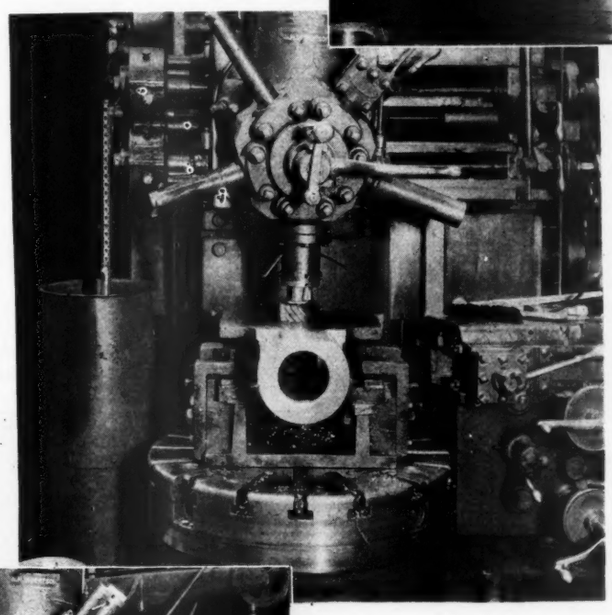
The problem was finally solved by the adoption of a special tool, having but one cutting edge. After the ½ in. hole is drilled, this one-flute cutting tool is inserted and the tapered hole is made. The cutter is then wound with steel wool and the hole burnished. The result is a smooth tapered hole, which produces a perfect hole in the grate casting.

Jig for Machining Crosshead Centers

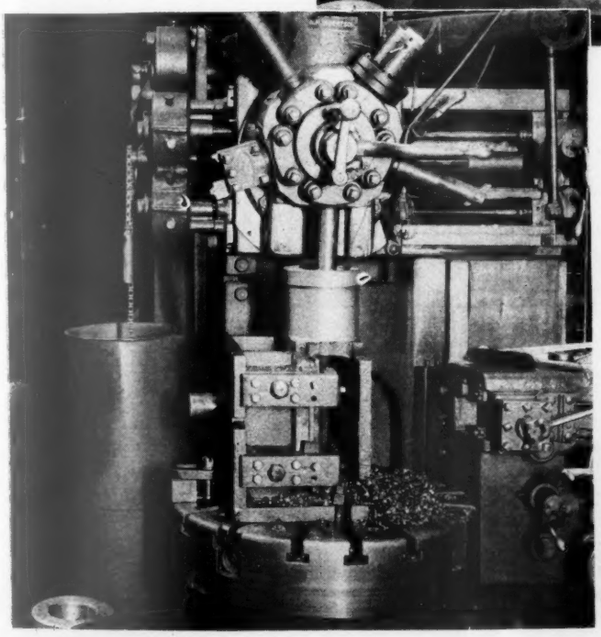
THE jig shown in the illustration is used to insure the accurate alinement of the piston-rod fit and the wrist-pin hole, while machining crosshead centers. The jig is constructed of a cast-steel angle plate with locating bosses on both faces. The bosses are machined to fit the hole in the table of the boring mill. Two parallel lugs are cast on the inside of the angle plate, and to each of these two L-shaped forgings are bolted, drilled and tapped for 1-in. set screws which clamp the crosshead to the jig. A third boss is located between the parallel lugs and centered with the boss on the bottom face of the jig. It is machined off just below the top of the parallel lugs and is bored out so as to receive rings that are turned to fit the bosses which are machined on the outside faces of the various classes of crossheads. The rings locate the crosshead on the jig and assure the alinement of the piston-rod fit and the wrist-pin hole.



The jig is made of 90 deg. angle plate with machined bosses to fit the hole in the center of boring-mill table



The crosshead is centered for turning the piston fit before machining the wrist-pin hole to insure the alinement of the two holes



In using the jig, it is placed on the table of the boring mill and clamped down with three bolts. The rough crosshead casting is then set up to machine the outside face. When this face of the crosshead is machined completely, it is taken out and a ring is selected which fits the boss on the outside face of the crosshead. This is slipped into the boss on the inside of the bottom face of the jig.

The crosshead is then turned over and thin parallel strips, marked for each class of crosshead, are placed between the crosshead and the permanent parallel lugs to center the piston-rod fit for machining.

After the second side of the crosshead is machined and the wrist-pin hole is bored and reamed, the jig is unbolted from the table and lifted by a crane and rebolted on the table on its second face, which is 90 deg. from its first position. The operation of turning, boring and reaming the piston-rod fit is then completed, the piston-rod fit being alined with the wrist-pin hole due to the fact that the crosshead is centered for machining the piston-rod fit before the wrist-pin hole is bored and reamed.

An Obscure Defect in Driving Wheels

ONE of the most difficult parts of a locomotive to maintain to standard blue-print size, with consequent likelihood of its giving satisfactory performance, is the driving wheel. Non-standard dimensions and inaccuracies in one part of the wheel center, tire and axle assembly are frequently overlooked at the general shopping or "corrected" by making a corresponding error in some other part of the assembly. An unusual and, to some extent, obscure defect, recently discovered, is shown in the driving wheel illustrated.

Driving wheel with rim depressions between the crank pin and the counterweight built up by electric welding

A certain class of heavy 2-8-2 locomotives on a well-known midwestern railroad was reported to be developing a serious pound in the main wheels, a pound which persisted in spite of generally conscientious maintenance work in the wheel shop. The counterbalance on these main wheels was carefully checked and every effort made to determine the cause of the trouble, without success, until the idea was conceived of checking the main wheel centers to determine if the rims formed true circles. A radius gage, applied to the lathe center hole of the axle and with an adjustable arm projecting over the rim, indicted at a glance that the rim was not a perfect circle, and this irregularity, with a corresponding one in the driving wheel tires, was responsible for rough riding of the locomotives.

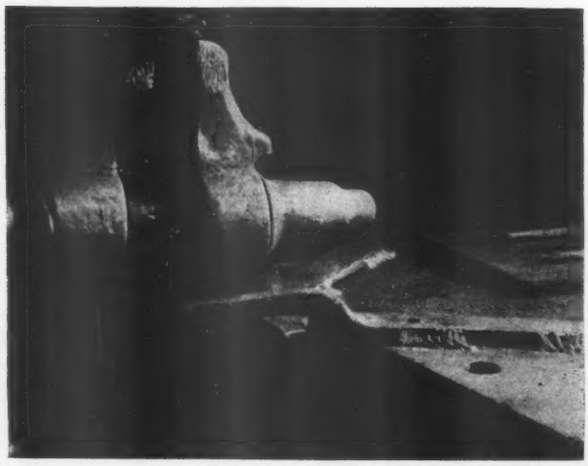
The main wheel centers on this class of locomotives had to be so heavily counterweighted that, referring to the illustration, it will be observed that practically 50 per cent of the wheel is solid and there are only two relatively light-weight spokes with intervening air spaces on either side of the crank pin. By use of the driving wheel radius gage, depressions were discovered on each side of the crank pin opposite these spokes to the amount of about 3/16 in. maximum and 3/32 in. average. It was discovered that even a new 3½ in. tire, when applied to a wheel center with this depression on either side of the crank pin, would conform to the wheel center and thus transmit a pound to the rail with resultant serious effect upon roadbed, equipment and riding qualities of the locomotive.

The reason for this depression in the rim of the driving wheel center is primarily the unequal distribution of metal and consequent more or less unavoidable excessive stress set up in the spokes. This stress, supplemented by additional stress due to tire shrinkage and by the heavy blows encountered in road service, evidently exerted an upsetting action on the material in the spokes and rim and was responsible for the inaccuracy in rim circumference reported.

The remedy adopted by the road in question was simply to build up the depressed sections of the rim opposite the spokes with electric welded material of a sufficient amount so that a finishing cut in the wheel lathe would give a wheel center accurate as the circumference. In the case of wheel centers unmounted, this welding rod, 3/16 in. in diameter, is applied by hand method, but, with wheel centers mounted on the axle, an old lathe, fitted with modern Westinghouse automatic welding equipment, is employed to apply the metal uniformly and with much greater efficiency than by hand. In fact, the entire circumference of a driving wheel can be built up with the automatic welder in approximately the same time as required to build up a quarter section by hand. Application of a new tire to the accurate wheel center, or re-applying and turning the old tire, then gives an accurate job and prevents pounding.

A Welded Vise Support

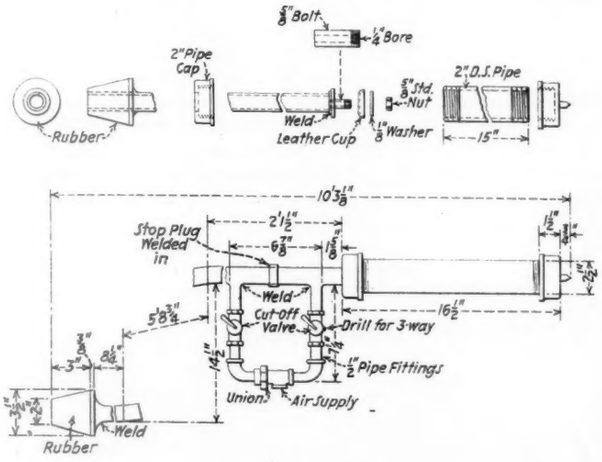
WHEN heavy duty is required of the bench vise there is often trouble in keeping it firmly anchored. This may be eliminated by forging the support shown in the illustration and welding it to the top of the bench, when the bench is of steel. The support is made of ½-in. by 1½-in. steel strap, the center being bent to a horseshoe shape and the two ends twisted half around and spread to a vee-shape. Where the vee begins a ½-in. by 1½-in. slot is drilled in each side of the strap, in which two steel keys are driven to secure the vise. A moment's work with the cutting torch is sufficient to loosen the vise if it must be moved.



The support is welded to the bench and fitted with keys to secure the vise

Unique Soot Blower for Oil-Burning Locomotives

A *DEVICE* for blowing soot from the flues of oil-burning locomotives is shown in the drawing. The overall length of the blower can be varied to suit various lengths of fireboxes and is designed with an offset to enable the operator to use it without the necessity of removing arch brick. The device consists of an air



The soot blower can be used without removing the arch brick

holding cylinder, one cut-out cock, one three-way valve, a section of pipe with a suitable offset to clear the arch brick, and a rubber cap fitted to the end of the offset pipe. The rubber cap is used to make an air-tight joint at the mouth of the flue while blowing. Double-strength pipe is used throughout and a stop plug is welded in the air line as shown in the drawing to prevent losing the air pressure against the piston in the holding cylinder.

When in use the end of the holding piston is inserted in a staybolt hole in line with the flue to be blown out. The rubber cap is held in front of the flue. The three-way valve leading to the cylinder is opened, forcing the holding piston outwards, thus clamping the device against a staybolt in the fire-door sheet and in a flue. The cut-out cock leading from the main air supply is then opened, allowing the air to pass into the flue and blowing the soot into the smokebox. When enough air has passed through the flue to clean it, the cut-out cock controlling the air supply is shut off and the device released by opening the three-way cock. The operation is then repeated after placing the holding cylinder and rubber joint in line with the same or an adjacent staybolt and another flue.

Piston-Rod Centering Device

AN ingenious and time-saving method of centering piston rods has been developed on the Chicago & North Western, as shown. Referring to the illustration, it will be noted that an old planer bed is mounted on two steel cross plates, the air motors for drilling either end of the piston rod being mounted in suitable brackets. These brackets are provided with tangs accurately fitted to slide in one of the table slots and capable of being tightened in any desirable position by means of a nut and wrench, as shown. The method of feeding the air motor and drill into the stock is shown in the illustration. The motor is equipped with a No. 2 Morse taper to accommodate either the ¼ in. center drill or the 60-deg. countersink subsequently used to give a suitable bearing for the lathe center.

The piston rod itself is supported on two roller V-blocks, capable of adjustment up and down by means of a spanner nut and wrench arrangement. The center clamping mechanism consists of a U-shaped strap held at the bottom by a taper pin and capable of tightening a small V-block against the axle by means of a hand screw.

While all of the piston rods shown in the illustration have been centered, the usual practice on the North Western is to load the two ways on the back of the machine with new rods, permitting them to roll to the

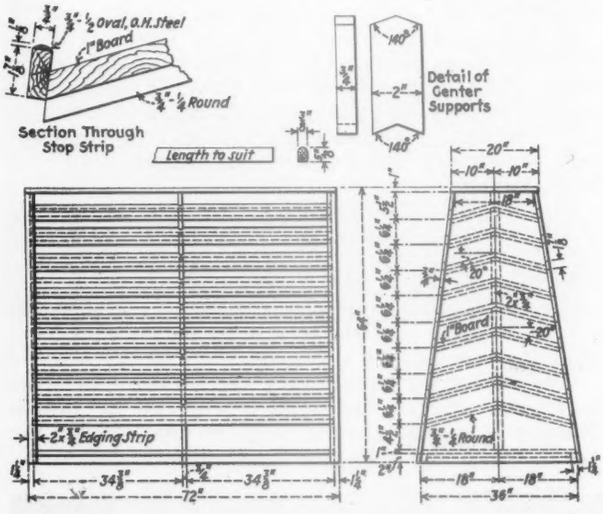
A double-end piston-rod centering device developed at Chicago shops of the C. & N. W.

machine, one at a time, as needed. The bracket gage *G* made of ⅛ in. sheet steel bent to an angle of 90 deg., as illustrated at the right in the photograph, is employed in the usual manner in obtaining the correct center point, which is prick-punched for drilling and countersinking.

After each axle is centered, the two offset vertical levers *L* are pulled down, thus raising the rod from the roller V-blocks. These levers are about four feet long and when resting on a truck at the front of the machine form an inclined way down which the piston rod can roll without manual labor, Any shopman knows how long it takes to center both ends of a piston rod accurately in an engine lathe by ordinary methods. This device, by a conservative estimate, permits one machinist and an apprentice to center a piston rod in approximately 15 min.

Standard Rack for the Tool Room

THE tool rack shown in the drawing is standard on a Class I railroad. It is made of kiln-dried yellow pine and is nailed together. The stripping used

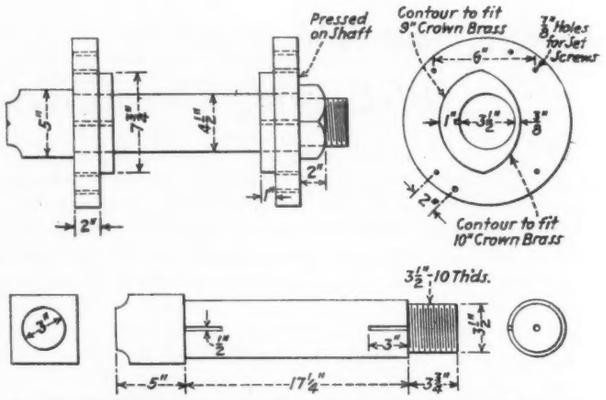


Rack on which tools can be displayed and readily identified

for spacing the shelves for various sizes of tools is of white pine. The racks are painted black with white lettering.

Mandrel for Turning Driving Box-Brasses

THE mandrel for turning driving-box crown brasses, shown in the drawing, consists of a shaft on the ends of which two discs are pressed and keyed the proper distance apart to suit the length of brasses which are to be machined. A lug is machined on the inside of the discs to fit the contour on the journal side of the crown brass. When in use the crown brass is set over the contoured lug and is keyed in place by three set screws at each end. The brass is then turned

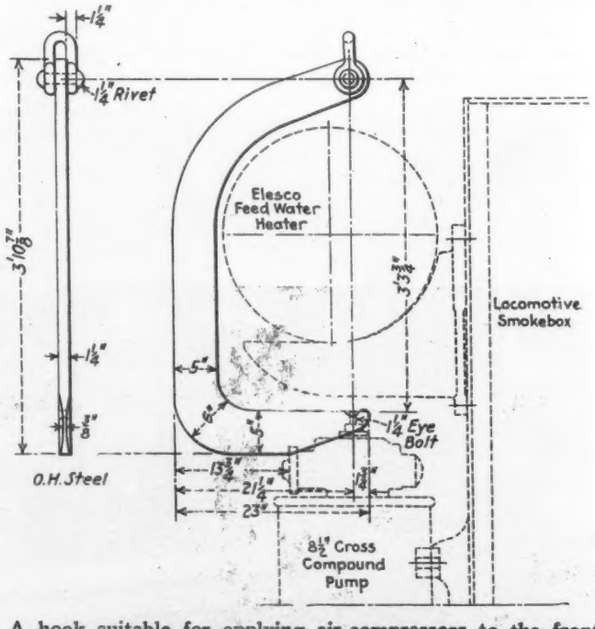


Contoured lugs on the mandrel aids in setting up the crown brasses for machining the driving-box fit

to fit the box. The drawing shows a mandrel designed for machining the driving-box fit on 9-in. and 10-in. crown brasses.

Applying Front-End Air Compressors

THE hook shown in the drawing was designed to overcome the difficulty encountered in applying air compressors on the front end of locomotives which are equipped with Elesco feedwater heaters. It is constructed of 5-in. by 1¼-in. iron fitted at one end



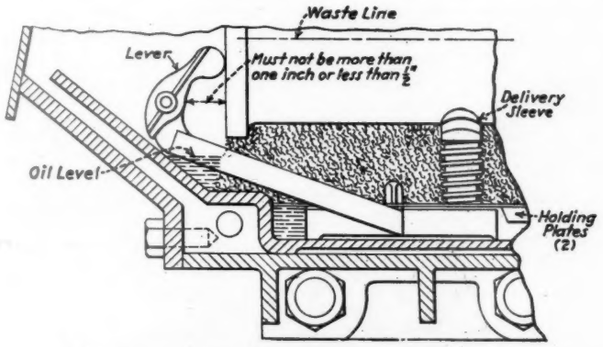
A hook suitable for applying air-compressors to the front end of locomotives which are equipped with Elesco feed-water heaters

with a hook or U-clamp for a crane attachment and at the other end with a groove to fit a 1¼-in. I-bolt for securing the pump compressor. The hook is 3 ft. 10⅞ in. long and is drawn to a width of 6 in. at the short-radius bend. The hook is shaped to encircle the feedwater heater, holding the pump in place without the necessity of swinging it against the brackets.

NEW DEVICES

Hennessy Mechanical Journal Lubricators

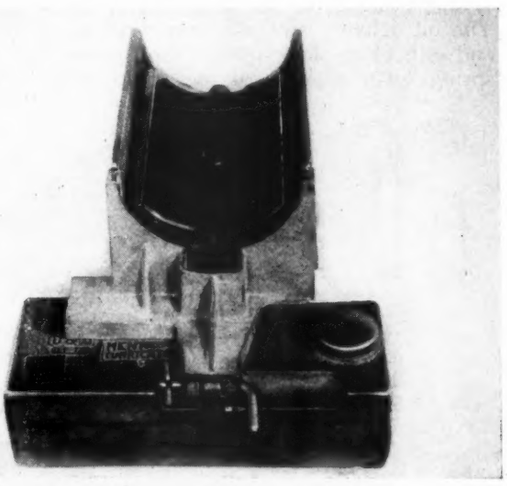
MECHANICAL journal lubricators, the product of the Hennessy Lubricator Company, 136 Liberty street, New York, which are designed to supply oil of any consistency in predetermined quantities by mechanical means to engine-truck, trailer-truck, driving-wheel and A. R. A. journals, have undergone considerable development since they were first described in the July, 1921, issue of the *Railway Mechanical Engineer*. These lubricators have few parts and can be applied in tender-truck, car-truck and trailer-journal boxes without any change in equipment. The engine-truck and driving-journal design include the cellars which are applied without change or addition to the bearings, journals or boxes.



A trailer-truck application of the Hennessy lubricator

Driving-Wheel and Engine-Truck Journal Lubricators

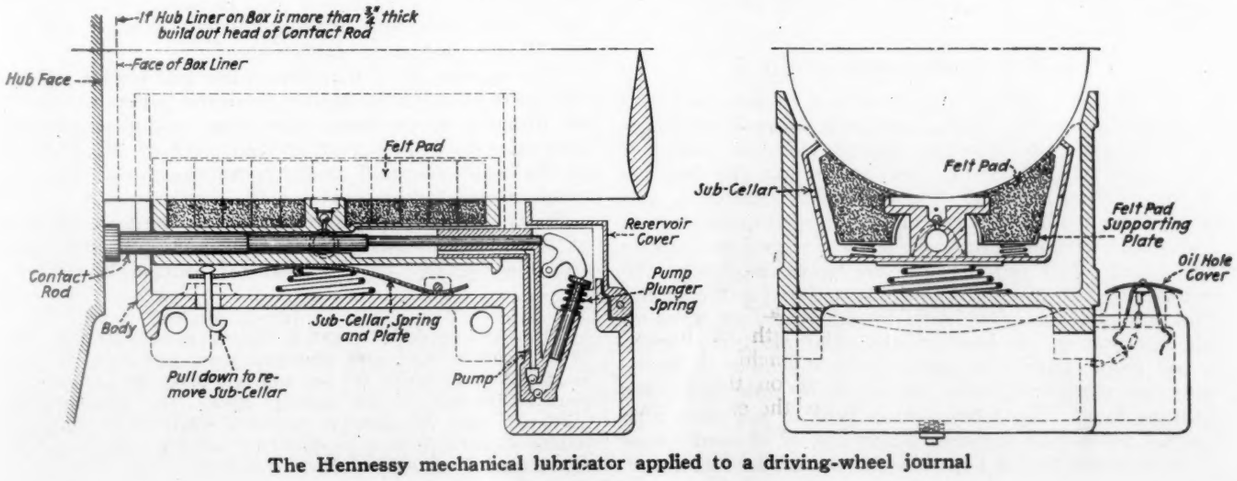
The engine-truck and driving-wheel journal lubricators are set in the driving-box and engine-truck cellars which are furnished to fit the boxes for each application. A felt pad is used as a medium for distributing the oil over the journal after it is pumped to the journal face by the mechanical pump located in the base of the cellar. Pumping action is obtained from the lateral wheel movement which is positive and regular. A contact rod, which is set against the driving-wheel hub, works the pump plunger which is set in the oil reservoir of the cellar. The oil is forced to the face of the journal through passages fitted with ball-



The driving-box lubricator assembly

check valves which prevent the oil from returning to the reservoir, thus insuring positive lubrication for the journal. The felt pad is kept in contact with the journal by means of a sub-cellar spring and plate. The felt pad is assembled in what is called a supporting plate. This plate is supported in the sub-cellar on four coil springs, the action of which keeps the felt pad in uniform contact with the journal face. Thus, the felt pad is held securely against the face of the journal and, being continually supplied with a quantity of oil, is able to distribute it over the face of the journal under all conditions, insuring constant lubrication when the equipment is in operation.

The engine-truck and driving-journal type lubricators

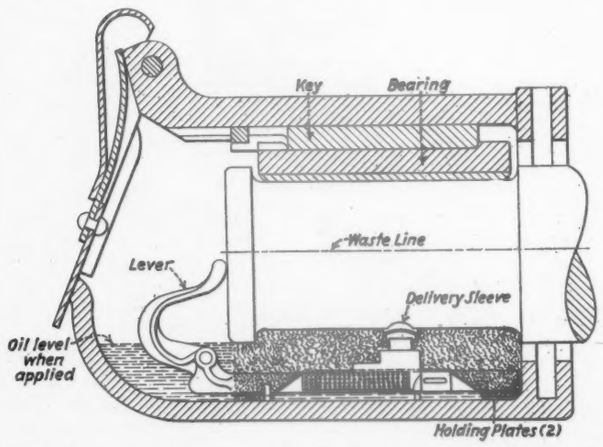


The Hennessy mechanical lubricator applied to a driving-wheel journal

are so made that all attention necessary can be given them and all parts can be removed for inspection without disturbing the cellar. This permits of the cellar being securely fastened in truck or driving box.

Trailer-Truck Lubricators

The trailer-truck journal lubricator can be set in the regular trailer-truck journal box without any change in equipment. The lubricator consists of an oil pump, a pump lever, an oil delivery sleeve, and two holding plates. The holding plates holds the lubricator in position in the box and keeps the waste from the base of the cellar thus forming an oil reservoir in the bottom of the box. The pumping action of this lubricator is also obtained from the lateral movement of the wheel. The oil delivery sleeve is contoured to fit the journal and is held in place against the journal face by a coil spring. The plunger of the pump is set at an angle



The lubricator assembly as applied to the journal boxes of tenders and cars

to the lubricator base in order to clear the offset and sloping end of the conventional type of trailer-truck journal box. After the lubricator is set in the journal box and the contour delivery sleeve set against the journal, the box is packed with waste in the usual manner. The two holding plates fit loosely in the bottom of the cellar above the oil reservoir which they form. Lugs on the lubricator body are used to keep the holding plates in place and to keep the lubricator located in its proper position under the journal in the cellar. After the journal is packed, enough oil is added to fill the space beyond the waste to within one inch of the journal.

A.R.A. Journal Lubricators

The A.R.A. journal lubricator for tenders and cars is similar to that of the trailer-truck journal lubricator with the exception that the plunger-cylinder casting is not set at an angle to the base of the box and that the device is much smaller. The oil delivery sleeve is contoured to fit the journal face, but the spring which holds it in tension against the journal is enclosed within the sleeve. In this lubricator the lateral motion of the wheel also furnishes the pumping action for the pump. Holding plates are set over the lubricator to form an oil reservoir in the base of the cellar and prevent the waste from coming in contact with the oil that passes into the plunger-cylinder before it is pumped to the journal face. The lubricator is held in position, with respect to end of journal, by means of a small piece of sheet metal that is keyed to the end of the lubricator. The other end of this piece of sheet metal rests against the back end of the journal box to prevent the lubricator from moving. In applying the lubricator, the waste packing is removed and the journal boxes jacked up. The bearing and key are then removed and the journal box jacked down on the journal. The lubricator is then placed in position under the journal and pushed back as far as possible. After the lubricator is applied, the journal box is jacked up, the bearing and key applied and the journal jacked down into position. The box is then packed in the usual manner with saturated waste. Oil is applied to box in usual manner.

Operating Tests

A number of the older type Hennessy journal lubricators, as well as the improved type, have been in service for a number of years, but the most comprehensive tests to which the lubricators for all journals have been subjected was that which has been recently made on the Baltimore & Ohio.

The B. & O. heavy Mikado locomotive No. 4485 was fully equipped with engine-truck, driving, trailer and tender-journal lubricators in March, 1929, and has been in continuous fast-freight service between Brunswick, Md., Potomac Yards, Va., Baltimore, Md., and Philadelphia, Pa., making more than 35,000 miles without failure or lubricating trouble of any kind.

Examination of the driving journals after 14 months service revealed that both hub faces of a pair of wheels

B. & O. locomotive 4485 on which mechanical journal lubricators were tested

were worn less than a total of 1/8 in. and that the crown brasses were not worn enough to require renewal. The main bearings showed .015 in. wear at the center line. The remaining driving journals showed .006 in. to .008 in. wear at the center line.

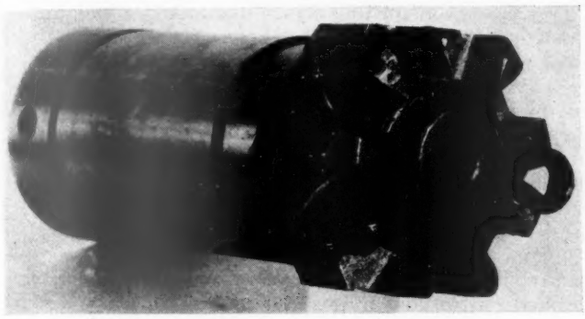
The records show that the trailer and tender journal lubricators had not been disturbed, the packing removed or attention given them other than oiling at monthly intervals, since they were applied. All of the journals of the locomotive and tender operated at much reduced temperatures.

So far as our records reveal this is the first instance of a heavy locomotive being fully equipped and operated successfully with mechanical journal lubricators.

THE CHICAGO, ROCK ISLAND & PACIFIC is painting the roofs of its suburban cars with aluminum paint to reflect, as much as possible, the rays of the sun and help make the car interiors more comfortable in the summer days. The application of aluminum paint to passenger cars is a result of the favorable results which have been produced by painting caboose cars in this manner.

Cooke Micro Nut and Cotter

A *CASTELLATED* nut, which can be set to 14 to 22 adjustments, depending upon the size of the nut, and which utilizes a self-opening and self-retaining type of cotter key, is a new product recently brought

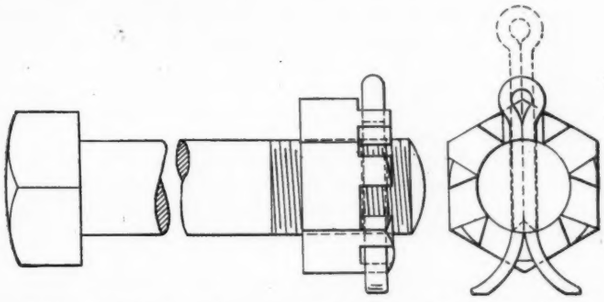


Cooke Micro 1¾-in. nut which has 18 adjustments and automatically spreads the cotter key

out by the American Railway Products Company, Inc., South Norwalk, Conn. As shown in the illustration, the castellated nut is milled in such a manner that the castellated portions are of triangular section and arranged so that the apex of one section is at the center of one end of the cotter-pin hole, the other end of the cotter-pin hole being fully exposed between two castellated portions for the insertion of the cotter pin.

When adjusting the nut, it is merely necessary to turn it until the apex of one of the castellated sections is in the center of the cotter pin hole, which automatically alines a full opening of the cotter-pin hole on the opposite end of the pin. Thus, a castellated Micro nut with the nine castellated sections has 18 adjustments

The Micro nut eliminates the necessity of backing off or loosening the nut for adjustment, which is a common occurrence in the use of the conventional type of castellated nut which has only six adjustments regardless of its size. The range of adjustments of the Micro nut depends upon the size of the nut used. The ⅜-in. to 1¼-in. castellated nuts with seven castellated sections have 14 adjustments; the 1⅜-in. to 1¾-in. nuts with nine castellated sections have 18 adjustments and



Assembly of the micro nut and self-opening cotter key

the 1⅞-in. to 2¼-in. nuts with eleven castellated sections have 22 adjustments.

The triangular sections with the apex in the center of the cotter-pin hole automatically opens the cotter keys as it is driven through the pin. The Micro nut does not require a special type of pin, but can be applied to all types of present or new equipment.

Heald Internal Grinding Machine

THE Heald Machine Company, Worcester, Mass., recently placed on the market its No. 77 heavy-duty internal grinding machine which is designed primarily for the rapid removal of large amounts of stock and the finishing of the work to close limits. It is driven by three motors totaling 31 hp., one for the wheel head, one for rotating the work, and one for driving the pump of the hydraulic operating system. The three motors are used to obtain direct drives for these units and to eliminate transmissions, gearing, belts, pulleys, drums, countershafts, etc.

The base of the machine is a four-ton one-piece casting heavily ribbed for rigidity. It is cast of fine-grain grey iron having a 20 per cent steel content for additional strength. A sliding table is supported on flat and V-ways which extend the full length of the base. The end of the base which supports the work-head is of T-section to afford maximum support for this unit and to provide for the transverse movement of the work head while the work is being fed to the wheel. The oil reservoir for the hydraulic operating system is cast in the base. A cupped rim around the base serves to collect coolant drippings and oil.

The flat and V-ways on which the main table slides are lubricated by a pressure-feed system to insure a positive supply of oil to the ways. The Heald hydraulic arrangement, which is operated by oil under constant pressure, is used to control the table speeds and the direction of its movement. A major portion of the hydraulic system is concentrated at the rear of the base. With the exception of the reverse box and valves, which constitute a complete unit at the front, and the cylinder and piston attached to the under side of the table, all of the system is on the outside of the rear wall of the base where it is enclosed by removable guards. A gear-type pump which is equipped with anti-friction bearings and is driven directly from a 3-hp. motor, is used to operate the hydraulic oil-pressure system.

Automatic reversal of the table is controlled by three adjustable dogs, two of which are set for the reversal of the table, providing any length movement up to a maximum of 36 in. The third allows the table to withdraw sufficiently so that the wheel can pass a truing diamond during the operation of truing the grinding wheel. A hand lever and foot treadle, working in conjunction with this dog, permits the table to withdraw when it is desired to true the wheel, measure the work or have the table go to rest position. Hand reversal of the table is obtained by moving a ball-handle lever

in the direction in which the movement is desired. This can be accomplished at any point in the travel of the table. Hand longitudinal feed for the table is provided by a rack and pinion operated by a hand wheel. A lever at the right of the hand wheel controls a valve which by-passes the oil, temporarily discontinuing the hydraulic functions of the table and allowing manual advance and return for face grinding as well as aiding in the setting up of the machine.

The wheel head unit is designed to insure rigidity of the spindle and maximum delivery of power to the wheel. The wheel head and driving motor form a single unit, the spindle bracket, motor platform and lower half of the belt guard being cast in one piece. The spindle is mounted in two precision-type anti-friction bearings carried in a cradle that is cast integral with the spindle bracket. A wheel guard covers the wheel at all times to protect the operator. The wheel is driven by a 25-hp. motor which is adjustable transversely on its platform by a star wheel and screw to compensate for the stretch of a 7 in. driving belt which transmits the power to the spindle.

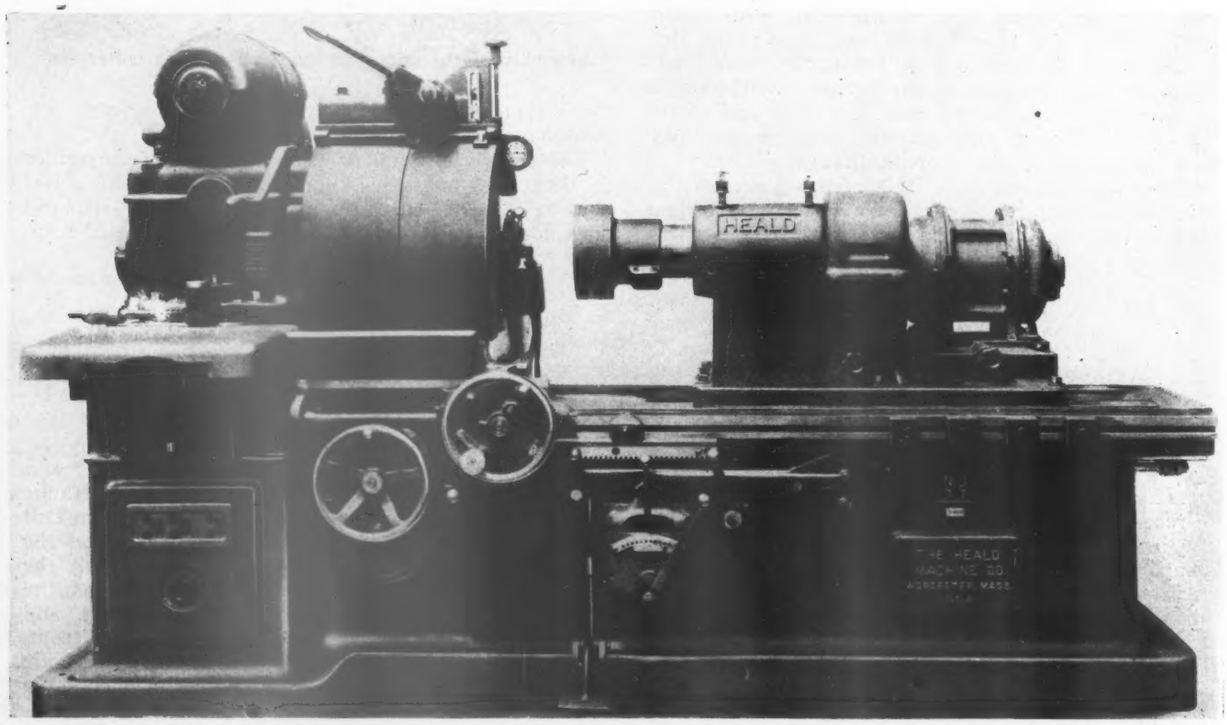
The work-head is mounted on a cross slide at the T-end of the machine and is clamped in position by six bolts sliding in a full circular T-slot which is machined in the bearing surface on the cross slide. The head can be swiveled on a large stud by means of a precision swiveling device. Adjustment of 22½ deg. is provided, the amount of swivel being indicated by a scale.

The work-head spindle is mounted on two anti-friction bearings and is driven by a hardened and ground worm and bronze worm gear which run in a bath of oil. The worm and wormshaft are carried in a bracket bolted to the spindle housing and are driven by a silent chain from a 3-hp. adjustable-speed D. C. motor through a double clutch of the disc type. Spindle speeds varying from 35 to 140 r.p.m. are available through the use of the adjustable-speed motor. A work guard is used to enclose the fixture to protect the operator from injury and to confine the coolant and abrasive dust to the limits of the machine.

The machine can be equipped with a dial indicator which enables the operator to follow a change of size by direct readings. The indicator not only tells him when a hole is finished but enables him to true the wheel at any predetermined point before finish size is reached.

The sizing-control unit has a diamond-pointed finger which is in contact with the hole of the work at all times when grinding but which can be swung out of the way by a hand lever to allow for the removal of the finished work and the chucking of a new piece. The position of this sizing unit can be adjusted for various diameters and lengths of holes. The indicator and finger are adjustable vertically, and the entire unit, including the clamping bracket and the swivel, is adjustable horizontally.

The swinging diamond or wheel-truing device swings on an initially-loaded ball bearing. It is hydraulically operated, adjusted for position and so located that it is swung back out of the way at all times when grinding. The diamond is presented to the wheel at 90 deg. to its axis and parallel to the ways of the main table and is swung down to truing position and back to rest position by a hand lever located at the front of the machine. A dog on the table is provided as a safety measure to trip the valve automatically and return the diamond to rest position if the operator fails to do it manually.



The Heald No. 77 internal grinding machine—The work is set up on a cross-sliding work head and is fed to the wheel

The feeding principle of the machine is different from other Heald internal grinders in that the work is fed to the wheel instead of the wheel being fed into the work. This is accomplished by mounting the work-head on a cross-slide carriage which slides in dove tailed ways on a bridge at the T-end of the base. Movement of the cross slide is obtained by means of a fixed

nut, on the under side of the slide, threading on a large diameter screw equipped with ball-thrust bearings. The screw is rotated by bevel and spiral gears and a connecting shaft from a ratchet and pawl feeding device at the front of the machine. Any amount of feed from .00014 in. to .0011 in. per stroke of the table is obtained by an adjustable pawl engaging the teeth of a circular ratchet on the cross-feed unit. The feed can be controlled by hand if desired. A coarse feed can be set for rough grinding up to a predetermined limit of finished size of hole at which point the roughing feed automatically changes to a finishing feed.

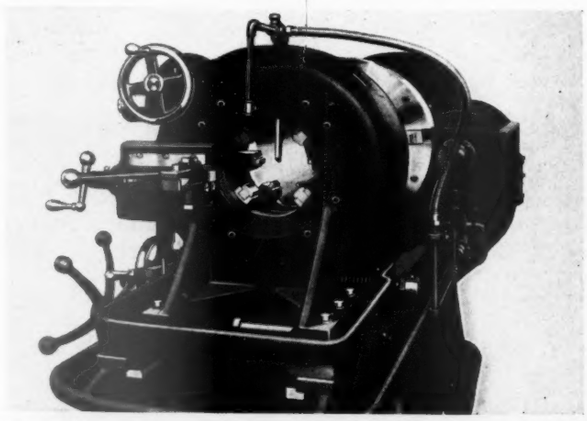
Anti-friction bearings are used for all revolving members which include such units as the work head, wheel head, oil pump, cross-feed screw, wheel-truing device, etc. Coolant is delivered at the grinding point in large volumes to cool the work and to carry away the sludge formed by grinding. The stream of coolant flows only while the grinding wheel is in the hole, a valve on the back of the machine assuring the automatic control of the flow of the coolant as the wheel enters and leaves the hole.

Specifications of Heald No. 77 Grinder

Largest bore that can be ground (using 12 in. wheel)	21 in.
Smallest bore that can be ground	3 in.
Greatest length of bore	15 in.
Swing over table	35 in. dia.
Swing inside std. water guard	21 in. dia.
Center of workhead spindle from floor	47 in.
Hole through spindle	1⅞ in.
Workhead speeds	35 and 140 r.p.m.
Table speeds	0 and 25 ft. per min.
Total transverse movement of workhead	14 in.
Maximum swivel of workhead	21½ deg.
Diameter of work-spindle flange	12 in.
Maximum travel of table	36 in.
Length and width of base on floor	116 in. by 46½ in.
Floor space (total)	123 in. by 78 in.
Net weight	18,000 lb.
Shipping weight, crated	19,300 lb.
Total hp. (3 motors)	31 hp.
Capacity of oil tank in base	20 gal.
Capacity of coolant tank	125 gal.

Jarecki Heavy-Duty Threader

THE Jarecki Manufacturing Company, Erie, Pa., has recently added to its line of products the Jarecki high-speed No. 8-HD pipe threader which is equipped with an automatic self-opening die head that covers the entire range of the machine. The cutting-off block, instead of being mounted in a loose member, is mounted in a slot cut directly in back of the die-head support. The sides of the block are cut at an angle with a gib to take up the wear. The cutting-off screw is equipped with a ball-thrust bearing to facilitate the cutting-off operation. Cutting-off and chamfering are completed in one operation, the high-speed steel chamfering tool being clamped beside the cut-off knife. A boss on the cut-off block carries a swivel reaming tool.



The automatic self-opening die head which covers the full threading range of the machine

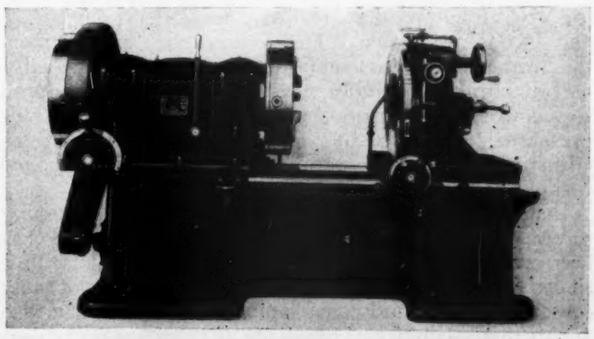
The die head guides are of an improved type, equipped with renewable hardened steel faces and controlled by a revolving hand wheel to steady the pipe while cutting off or reaming.

Besides having the features of single die-head operation, the machine is equipped with a forged-steel trigger extending inside the die head, which automatically opens the dies when the correct length of thread has been cut. The trigger can be set for any desired length of thread by means of a thread-length dial on the die head. When the chasers are open this trigger recedes out of the way, returning to position when the chasers are closed. Two sets of chasers, six to a set, are provided as standard equipment. Both sets thread the standard range of the machine from 2½ in. to 8 in., 8 threads. Additional chasers can be furnished for the extra capacity of 1½ in. to 2 in., 11½ threads.

The chasers are held in large steel holders and clamped in three directions by one screw to facilitate changing the chasers when changes in thread pitch occur. These holders are of 2-in. by 2½-in. solid square steel and fit into slots in the die head.

The machine is furnished with a three-jaw universal chuck at the front end of the spindle and a rear universal chuck designed with projections on the jaws for gripping flanges and fittings. The jaws in the front driving chuck have removable gripping inserts which can be renewed or resharpened when necessary.

A gear-driven reversible pump is furnished with the machine which forces 16 quarts of the oil to the die head per minute. Twenty streams of cutting oil bathe the cutters at the cutting points and wash chips through slots in the die head, eliminating the piling up of chips in front of the chasers to damage the die or threads. When the oil is turned off, a relief valve in the pump by-passes the surplus oil to the reservoir in the base of the machine. Strainers and a settling basin serve



The Jarecki No. 8-HD heavy-duty threader

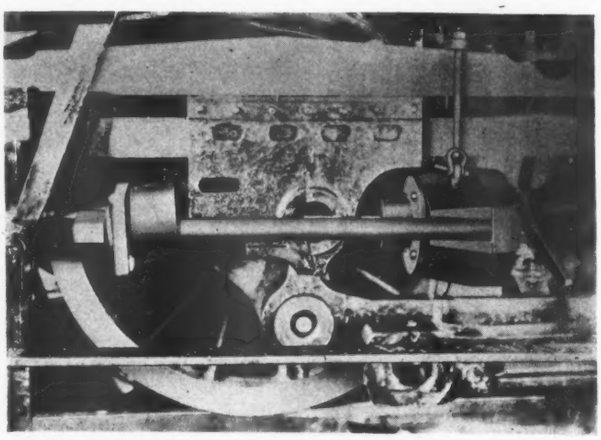
as a protection to keep chips from the reservoir and the suction lines. The spindle bearings of the headstock are lubricated by a chain which runs loosely over the spindle, bringing oil from the reservoir in the headstock. Oil grooves in the bearings distribute the lubricant. Timken tapered roller bearings are used throughout.

Either motor or belt drive can be used interchangeably. When equipped for belt drive, a single constant-speed pulley is used. With a motor drive, a constant-speed motor transmits the power to the machine by means of a silent chain. Overloads are provided for in the disc clutch by slippage. The starting and reversing switch is in an accessible position near the operator and all gears and moving parts are enclosed for his safety.

Watson-Stillman-Hollowell Piston Kicker

THE Watson-Stilliman Company, 75 West street, New York, has just brought out the Watson-Stillman-Hollowell piston kicker, a device for removing piston rods from crossheads. The machine is shown attached to the locomotive crosshead and guides ready to remove the piston. The piston kicker develops 125 tons hydraulic pressure which is supplied by a hand pump located at the hydraulic cylinder. The hydraulic cylinder is suspended from the guides back of the crosshead, the piston of the kicker passing through the center of the crosshead and resting against the piston rod of the locomotive. The machine is braced by a pair of rods which are attached to each side of the hydraulic cylinder and which pass on the outside of the crosshead to a yoke set over piston just ahead of the crosshead. By this arrangement the crosshead takes the reaction of the piston kicker as the piston is forced loose. It uses the entire crosshead for support and not the pin fit, thus eliminating the marring of the crosshead-pin fit or possible cracking of the crosshead.

An elevating and tilting buggy is furnished as part of the outfit. This buggy not only carries the piston kicker and parts from job to job, but also aids in setting up the equipment.



The Watson-Stillman-Hollowell piston kicker

Oxweld Two-Stage Oxygen Regulator

THE Oxweld type R-43 oxygen welding regulator, recently introduced by the Oxweld Acetylene Company, 30 East Forty-Second street, New York, is designed to insure a constant line pressure free from any fluctuation by means of a two-stage pressure-reduction system. This reduction is accomplished through two separate and independent sets of diaphragms, valves and springs. The full cylinder pressure of 2,000 lb. enters the regulator through a stem-type valve and is controlled by the first stage diaphragm. In this stage the pressure is reduced to less than 250 lb. per sq. in. and is non-adjustable. The oxygen then passes from this first reduction assembly to a second stem-type valve and diaphragm assembly where the pressure is reduced to the working pressure desired by the operator. This pressure is regulated by the operator by means of the adjusting screw, any operating pressure being obtained without fluctuation.

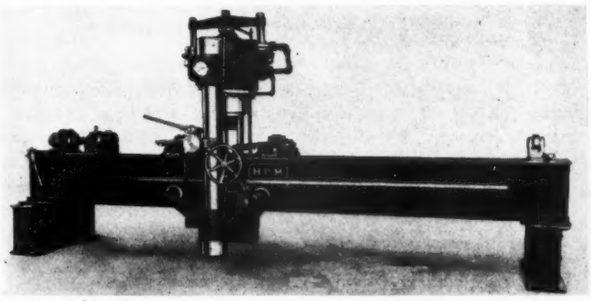
Instead of the usual handle-type pressure adjusting screw found on all other Oxweld regulators, there has been substituted on the R-43 regulator a screw with a ribbed cap. This change in external design not only presents a neater and come compact appearance but also avoids the possibility of breakage as there are no projections on the handle to be bent accidentally. The adjusting screw is of smaller diameter than the body of the regulator itself so that it is easier to pack for transportation from one job to another.

The Oxweld R-43 two-stage oxygen regulator into which the full cylinder pressure of 2000 lb. enters

Hydraulic Straightening Press

THE Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, has recently announced a line of hydraulic presses for straightening shafts, axles, bars, rods, etc. The line of presses is designed with a movable pressure unit so that the ram can be moved conveniently back and forth over long or heavy distorted work which is held in a work-supporting bed. The cylinder and columns are mounted on a carriage fitted with wheels to facilitate its movement along the bed.

A new oil-pressure system designated as the H-P-M Fastraverse system is employed for operating the press ram to and from the work. The machine also incorporates the H-P-M Precision manual control which provides means for governing both the direction and speed of the press-ram travel. This is accomplished through a single hand lever. When the lever is in mid-position, the press is at rest. When the lever is moved forward from neutral, the press will move forward and when the position of the lever is reversed, the press ram will return. The speed of the press ram is proportional to the distance the operating lever is moved off of the neutral position in either direction. Thus, with the lever moving forward to its extreme forward position, the press ram will move downward at its maximum rate. The motion of the ram during both the rapid advancing speeds and the slow pressing speeds is controlled by this one lever which is a remote control for the auxiliary hydraulic power employed to operate the main reversing and speed mechanism. When in use, the shaft to be straightened is placed in the supporting bed and the ram utilized at the points of distortion, the ram and cylinder being mounted on the movable carriage on the supporting bed facilitating the straightening of the piece.

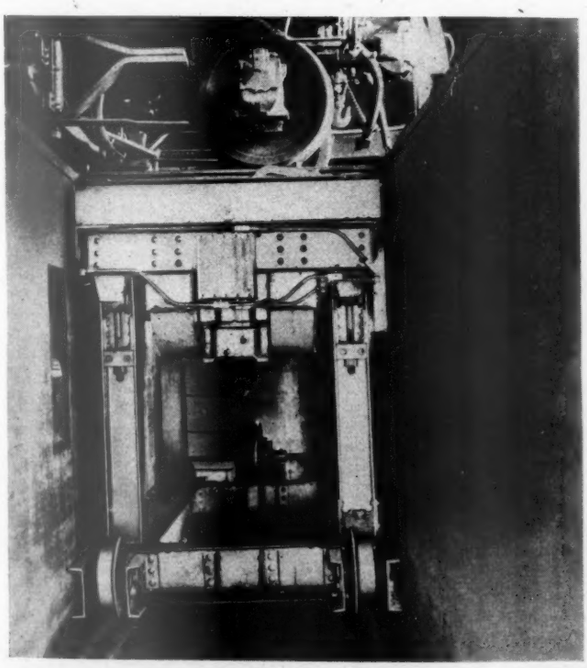


Hydraulic straightening press for shafts, axles, rods and bars

Six standard sizes of machines are available in this H-P-M line of straightening presses, the first four having pressing capacities of 75 tons, 100 tons, 150 tons and 200 tons, respectively. The remaining two are heavy-duty sizes having pressure capacities of 300 tons and 400 tons.

Shaw Electric Drop-Pit Table

SHAW Crane Works of Manning, Maxwell & Moore, Inc., New York, recently placed on the market a drop-pit table design the outstanding features of which are pull-up or tension-lift wire-rope hoists, stable lifting columns, and an oil-tight enclosure for the operating machinery. It is built in standard capacities of 30 tons and 50 tons, in both movable and stationary types, and is made up of three principal parts. The truck is an all-steel carriage with four H-beam columns for supporting and guiding the lift. The lifting table is equipped with an electric motor, a magnetic brake, limit stops, worm and spur gearing, and four hoisting drums, double flanged for the flat-wire rope. The table top is a heavy structural frame equipped with locking bars and sections of rail to form a continuous track over the pit when locked in position.



An installation of the Shaw electric drop-pit table

The lifting table raises and lowers itself on the four flat wire-rope cables guided by the four H columns. The flat wire rope is of 4 in. by 3/8 in. flexible plow-steel wire hoist cable with a factor of safety of five at the rated hoisting capacity of the table. The cable ends have adjustable anchorages for the purpose of maintaining the rail level of the table top.

An automatic magnetic brake on the hoist-motor shaft prevents any appreciable drift when the power is shut off and facilitates the spotting of the table top for the operation of the locking bars. Over travel of the hoist at both top and bottom limits is prevented by electric limit switches which automatically open the power circuit and apply the magnetic brake. The worm gear reductions are of the self-locking type to prevent the load from overhauling.

All gears operate submerged in oil, the worm-gear reductions in oil-tight cast gear housings and the spur gears in arc-welded sheet-steel gear cases. Renewable

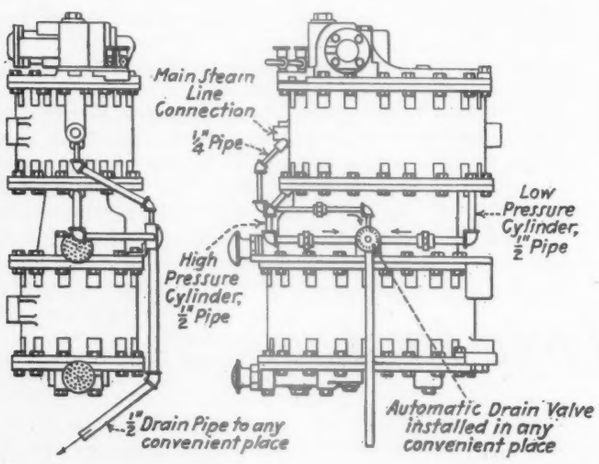
bronze bushings are employed for all shaft bearings and Alemite lubriction is standard equipment.

The four horizontally sliding locking bars are operated by racks and pinions from a single lever. These locking bars engage steel-lined pit-wall pockets and support the table top with the surface rails mounted thereon for all traffic over the track.

The table is furnished with electrical equipment for either AC or DC power and with single-speed push-button control.

Frederick Automatic Drain Valve

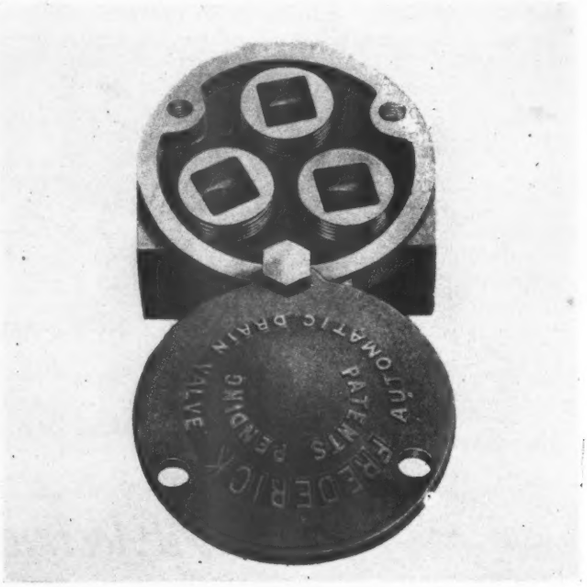
AN automatic drain valve designed to keep the steam cylinders of cross-compound air compressors free from condensation, is a product which has recently been placed on the market by the Frederick Iron & Steel Company, Frederick, Md. The drain valve always stands open when the governor is closed. The reduction in steam pressure as the result of the governors closing, causes the ball valves of the drain valve to fall from their seats thus allowing any condensation which has formed in the steam chest, the lower end of the cylinders and the connecting pipe between the governor and the pump to drain through the valve.



The application and piping arrangement of the Frederick drain valve

The drain valve is of simple construction, there being no moving parts included in its design. It can be applied at any convenient place beneath the lowest drain connection of the air compressor on a small bracket attached to the air compressor head.

The drain valve is applied in the following manner:

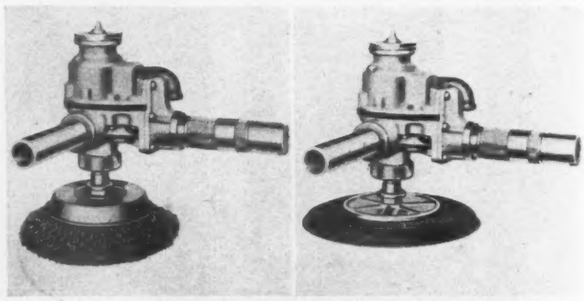


The Frederick automatic drain valve for air compressors

Remove the two ½-in. pet cocks from the lower end of the steam cylinders and the ¼-in. pet cock from under the main-steam inlet boss. Connect the two ½-in. pipe taps on each side of the drain valve to the lower end of the steam cylinders and the ¼-in. pipe tap on the top of the drain valve to the main steam inlet boss. A ½-in. pipe is then run from the bottom of the drain valve to any convenient point for drainage.

Rotor Cleaning and Rubbing Tool

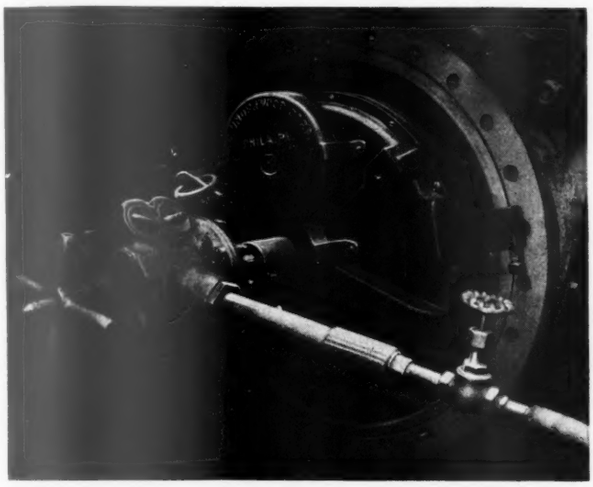
AN air operated tool which is adaptable to a variety of uses is a recent product announced by the Rotor Air Tool Company, 5704 Carnegie avenue, Cleveland, Ohio. With a cupped brush the tool is used for cleaning rust, paint and scale from tanks, steel cars, pipe and pipe lines, steel beams, etc. and for removing sand from castings. With pad and discs, it can be used for mechanically rubbing filler on castings, preparatory to painting. It can likewise be used for light sanding operations on either metal or wood. The tool can also be used with various other types of equipment for lacquer rubbing and polishing on car bodies, for finishing stone and concrete, nut setting and for close-quarter small drilling. The tool weighs 6 lb.



A wire brush or discs can be mounted on the tool for cleaning or rubbing

Improved Facing Machine

AN improved design of locomotive cylinder and dome facing machine has recently been placed on the market by H. B. Underwood Corporation, 1015 Hamilton street, Philadelphia, Pa. The machine is pneumatically operated and consists of two discs. The inner, or lower, of these discs is designed to slip into the counterbore of the cylinder or the dome and is equipped with adjustable set screws which, when they are set out, hold the machine firmly in place. A circular rack is cut in this disc. The gearing which engages in this rack revolves the top disc which carries the tool slide. The tool slide is fed out by a star wheel which is equipped with a clutch to disengage it for hand feeding, starting cut, etc. A long detachable hand crank is used to draw the tool slide back towards the center or to move it outward when placing the tool against the work. The machine will feed automatically when a lever with the clutch pin attached is thrown in.



The Underwood improved cylinder and dome facing machine

Capacities of Underwood Facing Machines

No.	Range	Weight, boxed
0	8 to 15 in.	162 lb.
1	13 to 20 in.	132 lb.
2	18 to 30 in.	235 lb.
2½	22 to 34 in.	335 lb.
3	26 to 40 in.	368 lb.

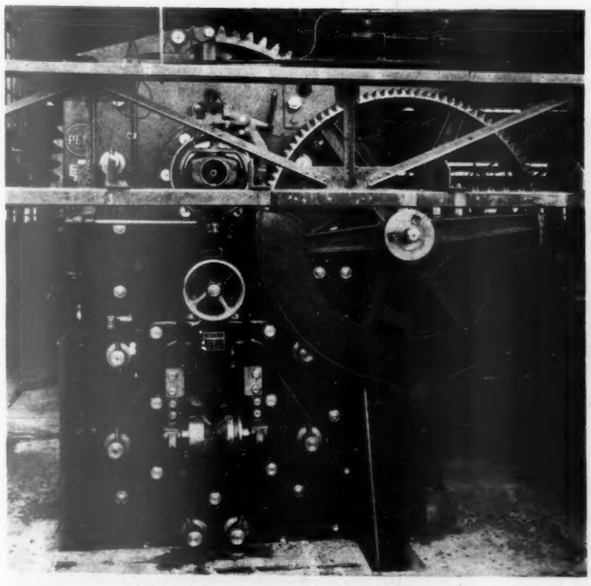
The all-steel gears and other working parts of the facing machine are completely covered. The machines are self-contained and are designed to complete a facing operation with much more dispatch than that accomplished with the design which it has replaced.

This facing machine is made in five sizes which are designated as Nos. 0, 1, 2, 2½ and 3, respectively. The capacities of these machines are shown in the table.

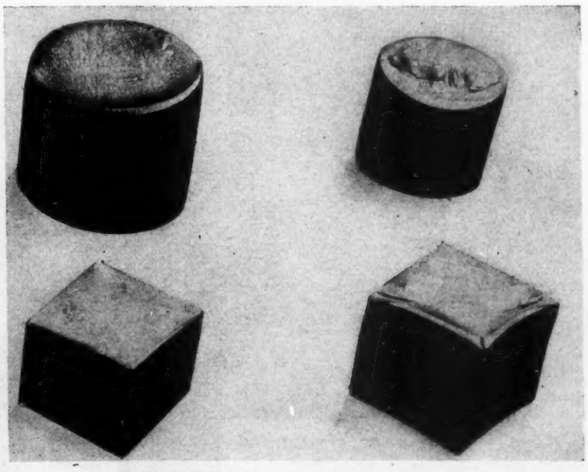
Pels Improved Billet Shears

A NUMBER of improvements have recently been incorporated in the Pels type FV heavy billet shears, a product of Henry Pels & Company, New York. The new features of the machine includes the following: A band brake on the eccentric shaft which is controlled by the clutch mechanism and which automatically stops the shaft in its highest position; a special back-lash pin which is built in on the clutch to insure against back lash which is apt to occur particularly while cutting hard steel and which often interferes with the smooth operation of the clutch.

The machine is also equipped with a set of new style knives, the design of which makes it possible to obtain cuts of much better quality than were obtainable with the conventional-type knives, used in former designs of the FV shears. The knives can be furnished for cutting



The improved Pels type FV heavy-billet shears



Left shows material cut with Pels new-style knives—Right shows the same material cut with conventional type of knives

square as well as round stock. For purposes of comparison one of the illustrations shows the same size and grade of material cut with both the conventional knives and new style knives. There is a notable difference in the surface of the end as well as in the squareness of the cut.

Sullivan Safety Lighting Cable

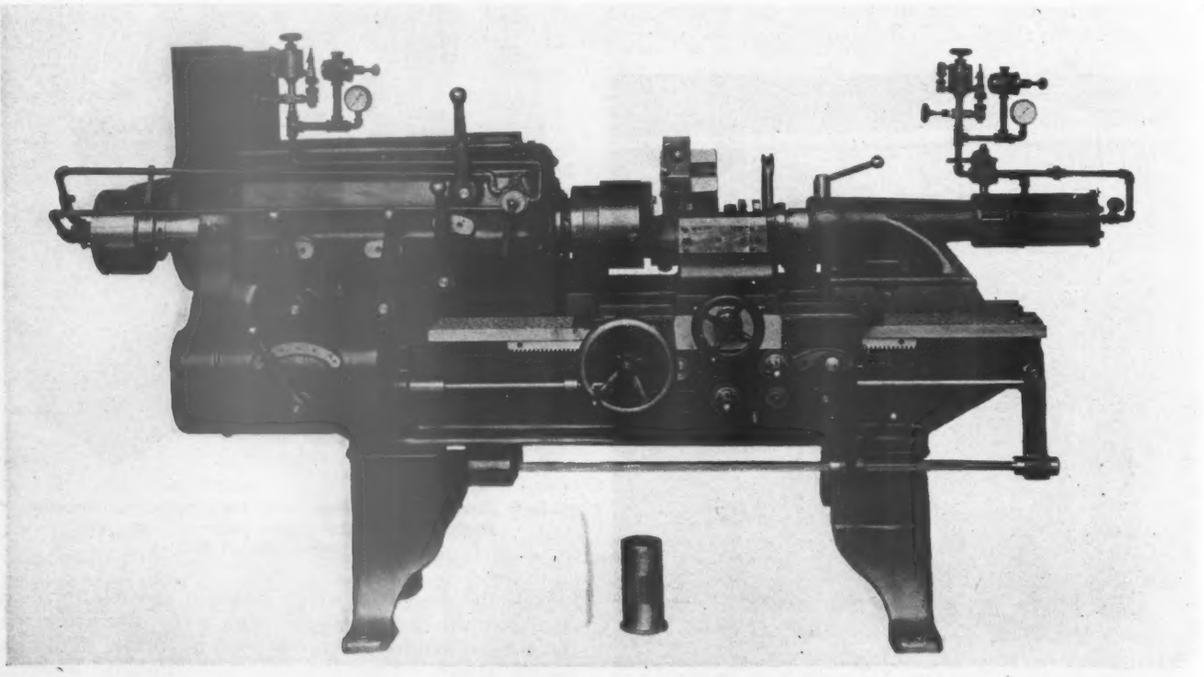
AN extension safety lighting cable, designated as the "Stringalite" extension, has recently been developed by the Sullivan Machinery Corporation, 400 North Michigan avenue, Chicago. The cable was developed especially to withstand the severe demands of locomotive shop and enginehouse service. It is made of moulded rubber and stranded No. 10 two-conductor light cable into which rubber-covered porcelain lamp sockets are vulcanized at 33⅓ ft. intervals. The cable and connectors are tested at 1,500 volts. Moulded-rubber blank screw plugs are used to seal the light sockets that are not in use to insure a moisture and corrosion-proof cable.

The extension light is carried in stock in lengths of 100 ft. and 200 ft. with three lamp sockets to every 100-ft. length and with end connectors attached. The cable weighs 23 lb. per 100 ft. Special fittings which can be obtained for use with the light are two-way rubber-covered branch connectors with male end connections, three-way rubber-covered branch connectors with male end connections, wall sockets with end conduit outlets and wall sockets with side conduit outlets.

Sullivan Stringalite extension lighting cable

Monarch 20-In. Lathe

THE Monarch Machine Tool Company, Sidney, Ohio, has recently developed and placed on the market a 20-in. lathe designated as the Monarch Model H machine. It is equipped with an eight-speed helical-geared headstock which is arranged for single-pulley and direct-motor drive. The lathe is equipped with a three-jaw Logansport air chuck and an air cylinder for operating the tailstock spindle. In addition, it has an anti-friction-bearing cone tailstock center and a back-arm facing attachment for facing cylinder sleeve such



The Monarch model H 20-in. lathe

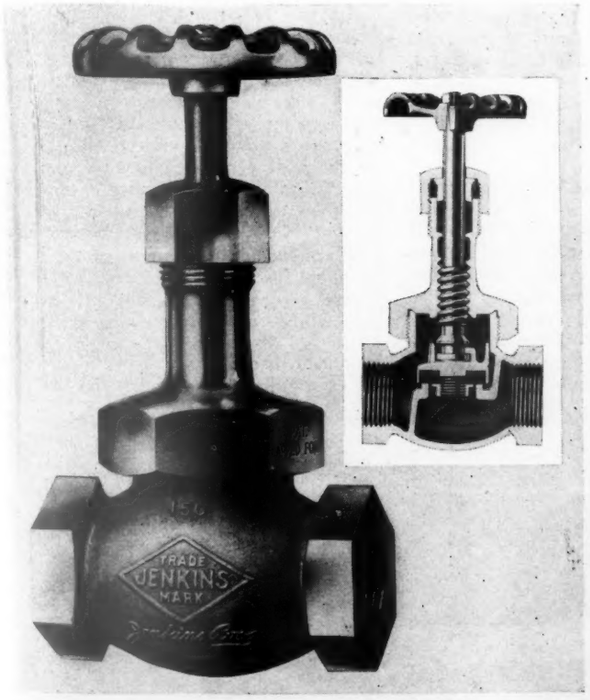
as is shown beneath the lathe in the illustration. There are three tungsten-carbide turning tools in a front tool rest and one in a rear facing rest.

The crated weight of the machine without the motor is approximately 4,600 lb. The shop space which it occupies is 124 in. long, 48 in. wide and 71 in. high. The capacity of the driving motor ranges from 7½ hp. to 10 hp. The lathe will accept 52¾ in. between centers, will swing 11 in. over the cross slide and 20 in. over the carriage wing.

The dimensions of the cylinder sleeve shown beneath the lathe are 4⅜ in. outside diameter by 9½ in. long. They are machined at the rate of 300 surface cutting feet per minute, a spindle speed of 240 r.p.m. and a feed of .040 in. They are finished in 15 sec. as against 2½ min. which was required by the manufacturer's former method.

Jenkins Bronze Valves

A *LINE* of standard bronze valves with one-piece screw-over bonnets and which are designed for 150 lb. steam working pressure or 250 lb. oil, water or gas working pressure, has recently been developed by Jenkins Bros., 80 White street, New York. The valves, which are made in globe-valve, angle-valve, cross-valve and check-valve types, are made of electric-furnace bronze. The one-piece screw-over bonnet which is in combination with a disc holder, designated by the manufacturers as the Slip-on Stay-on disc holder, is an innovation in bronze valve design. The one-piece bonnet construction facilitates its removal from the valve body and is designed to prevent springing or distortion even though the bonnet is removed and replaced repeatedly. The design of the valves provides interchangeability of bonnets between the globe-valve and angle-valve types.



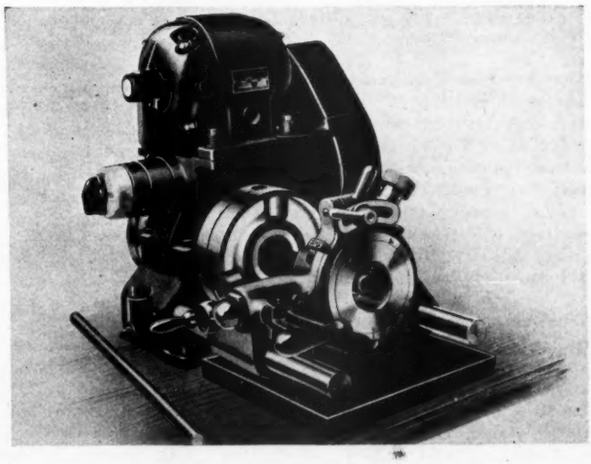
The Jenkins bronze globe valve illustrating the one-piece screw-over bonnet

The Slip-on Stay-on disc holder is a feature which is made possible by the one-piece bonnet design. The disc can be changed by opening the spindle a turn or two, it not being necessary to open the spindle completely. The disc holder does not fall off the spindle while the bonnet is being removed from the valve body. It stays on the spindle until the spindle is turned in the opposite direction, at which time the disc holder can be readily slipped off the spindle. The renewable disc of the valve is of a resilient composition and is compounded for the high-pressure service for which the valve was designed.

The Oster Tom Thumb Pipe Threading Machine

A *PIPE* threading machine, designed to cut off thread, ream and chamfer pipe ranging from ¼ in. to 1¼ in. in size and designated as the "Tom Thumb" pipe machine, is a recent product placed on the market by the Oster Manufacturing Company and the Williams Tool Corporation of Cleveland, Ohio. The machine is 18½ in. high, 16 in. wide and 23½ in. in depth. Included in these dimensions is a ½-hp. Domestic electric universal motor which automatically adjusts its speed to the pull on the dies.

Although the machine was originally designed and built for the threading of small sizes of pipe, a special bolt chuck is provided which makes it possible to thread bolts from ⅜ in. to 1½ in. in size. The machine is



The Oster Tom Thumb pipe machine

thus adaptable for a wide range of uses.

Tests which have been conducted with the machine have shown that a standard thread on ¼ in. and 1¼ in. pipe can be cut in 12 sec. and 18 sec., respectively. The actual floor to floor time, including chucking, threading, reaming, cutting off and removing the pipe from the machine requires 1 min. and 17 sec. for 1¼ in. threads, 58 sec. for ½-in. threads, and 45 sec. for ¼-in. threads.

Power is transmitted from the motor to the machine by means of a double-V belt. The machine is built of close-grained cast iron and is equipped with Timken roller bearings throughout. It is furnished with a cutting off and reaming attachment and a reversible snap switch.

Among the Clubs and Associations

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—The Car Foremen's Association of St. Louis will hold an entertainment and dance on the evening of October 14 at the American Hotel Annex, St. Louis, Mo.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—The annual entertainment and dance of the Car Foremen's Association of Chicago will be held at 8 p. m. on October 13 at the Morrison Hotel, Chicago.

CANADIAN RAILWAY CLUB.—J. H. Ramville, Esq., K. C., chairman of the Harbor Commission of Montreal will present a paper on the Transportation Problems of a Great Port before the meeting of the Canadian Railway Club which will be held at 8 p. m. on October 13 at the Windsor Hotel, Montreal.

NEW ENGLAND RAILROAD CLUB.—Dr. Harold M. Frost, chief surgeon of the Boston & Albany, will talk on the health of railroad employees before the meeting of the New England Railroad Club which will be held at 6:30 p.m. on October 14 at the Copley-Plaza Hotel, Boston, Mass. Dr. Frost's paper will be entitled "North of Fifty-Three."

EASTERN CAR FOREMEN'S ASSOCIATION.—The next meeting of the Eastern Car Foremen's Association will be held on October 24 at 8 p. m. at the Engineering Societies building, 29 West Thirty-Ninth street, New York. W. S. Spieth, manager roller bearing unit, American Steel Foundries, will present a paper on roller bearings for freight and passenger cars and locomotives and tenders.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—The Southern and Southwestern Railway Club will meet at its next bi-monthly meeting on November 20 at 10 a. m. on the roof of the Ansley Hotel, Atlanta, Ga. Papers on Things the Public Should Know about the Transportation Situation and Calibrating the Human Factor will be presented by A. E. Clift, president of the Central of Georgia, and J. L. Bacon, sales manager of the Valve Pilot Corporation, New York, respectively. Following the meeting the regular luncheon will be served.

WESTERN RAILWAY CLUB.—E. L. Manning of the General Electric Research Laboratory, Schenectady, N. Y., will present a paper on the Relation of Scientific Research to Modern Industry and Transportation before the meeting of the Western Railway Club which will be held on Monday evening, October 27, at the Hotel Sherman, Chicago, following a Dutch-treat dinner at 6:30 p.m. Mr. Manning will demonstrate many electrical and scientific devices, including those displayed at the General Electric exhibit during the Mechanical Division convention at Atlantic City last June. Air Transportation will be discussed at the November meeting of the club.

PACIFIC RAILWAY CLUB.—The Pacific Railway Club will meet on October 9 at 7:30 p.m. at the Transportation Club, Palace Hotel, San Francisco, Cal. "The Traffic Department as the Traffic Man and the Shipper See It" will be discussed. The November meeting will be held at the Hewhouse Hotel, Salt Lake City, Utah, where a large attendance of railroad men from the states of Nevada, Utah, Colorado and Wyoming is expected. Heretofore, it has been impossible for the members living in these states to attend the various meetings because of the great distance which they would have to travel, so the Pacific Railway Club now plans to hold at least occasional meetings within this intermountain territory.

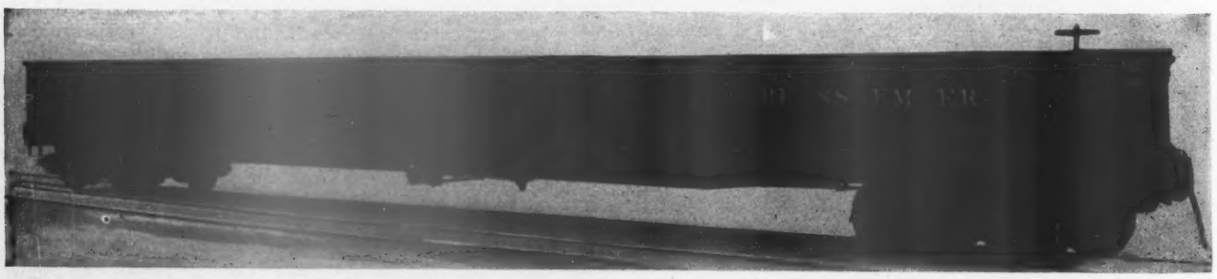
CAR FOREMEN'S ASSOCIATION OF OMAHA.—A technicality of A. R. A. Rule 4 in connection with refrigerator cars will be discussed by D. M. Raymond, general car foreman of the Nebraska district of the Union Pacific at the meeting of the Car Foreman's Association of Omaha which will be held on October 9 at 2 p.m. at the office of the general car foreman of the Chicago, Burlington & Quincy at Omaha, Neb. F. M. Rezner, general car foreman of the Omaha division of the C. B. & Q., and chairman of the Packing House Committee, will make a report of his investigation as to defect carding on privately owned cars at South Omaha.

* * * *

Club Papers

Fuel Economy

New York Railroad Club.—Meeting held at the Engineering Societies building, 29 West Thirty-Ninth street, New York, Friday, September 19. Paper by Robt. E. Woodruff, operating vice-president, Erie, entitled "Our Experiences in Saving Coal." ¶ Mr. Woodruff in introducing his paper stated that the amount of coal burned on the railroad per unit of work is now recognized as a measuring stick of that railroad's efficiency. When the campaign for fuel conservation was first inaugurated, he said, efforts were concentrated on better firing. Accordingly fuel supervisors were appointed and road foremen of engines were spurred into action to educate firemen to do better work. The whole campaign, he pointed out, was turned over to these fuel supervisors and they did produce favorable results with the engine crew. ¶ In their endeavors to save coal, he said, these supervisors argued for better locomotive maintenance. To some extent their pleas were not heeded. The enginehouse foreman's job was to dispatch engines in shape to make a successful trip, and he was not particularly interested in what he thought were the alibis of the fuel supervisors for not saving more coal. Whether the engine operated efficiently or not, Mr. Woodruff pointed out, was a refinement not given much consideration by shop forces. There were very few, if any, records kept by any one at that time which reflected true operating conditions of locomotive efficiency. ¶ Mr. Woodruff discussed at considerable length the establishment of cost studies and the



Sixty-five foot gondola car built for the Bessemer & Lake Erie by the Greenville Steel Car Company

development of more efficient motive power with respect to fuel economy. He laid considerable emphasis on the important part that such devices as stokers, superheaters, feedwater heaters, automatic firedoors, grates, etc., had played toward securing increased economy in the consumption of locomotive fuel.

Air Brake Maintenance

Manhattan Air Brake Club.—Meeting held in Room 2300, 150 Broadway, New York, Friday, September 19. ¶ The Manhattan Air Brake Club discussed ten subjects at its first meeting for the season 1930-1931. The first subject was a topical discussion of air brakes and questions by the members. This was followed by a discussion of steam-compressor governor installation, the repairing and testing of distributing valves, gas-electric rail-car air-brake equipment, soft and metallic packing for piston rods, centrifugal dirt collectors and branch pipe tees on locomotives, train control, reconditioning the piston cylinder of triple valves, single car testing device for freight and passenger service, and A.R.A. type pressure retaining valves. ¶ In discussing the subject of the repairing and testing of distributing valves, it was pointed out that while Federal law requires that distributing valves be cleaned every six months or oftener, if conditions require, it was sometimes impracticable to wait six months between cleaning periods. The question was asked: Are distributing valves applied to locomotives after being cleaned without first being tested on the test rack? Practically all of those present reported that these valves were placed on the test rack before going into service.

Developments of Structural Steel Welding

The American Welding Society.—Meeting held Tuesday, September 16, 1930, at the Westinghouse Lighting Institute, Forty-Sixth street and Lexington avenue, New York. ¶ The meeting was addressed by Gilbert D. Fish, consulting structural engineer, of the Westinghouse Electric and Manufacturing Company and by John J. Crowe, Air Reduction Company, Inc. Mr. Fish discussed the extent to which the various cities of the United States had accepted welding structures in their building codes and presented on a screen various all-welded structures which have been built throughout the country. Mr. Fish also presented a hypothetical-welded structure one mile high which he used to illustrate a discussion of stresses and strains on the various members of such an all-welded structure. ¶ Following this address Mr. Crowe discussed the flame cutting of steel. The illustrated discussion included the developments which have been made in the use of the oxy-acetylene cutting torch and in the use of machines for the cutting of various shapes. ¶ The meeting concluded with an inspection of the Westinghouse Lighting Institute which included a demonstration of its many lighting fixtures and facilities.

Directory

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of mechanical associations and railroad clubs:

AIR-BRAKE ASSOCIATION.—T. L. Burton, Room 5605 Grand Central Terminal building, New York.

AMERICAN RAILWAY ASSOCIATION.—DIVISION V.—MECHANICAL.—V. R. Hawthorne, 59 East Van Buren street, Chicago.
DIVISION V.—EQUIPMENT PAINTING SECTION.—V. R. Hawthorne, Chicago
DIVISION VI.—PURCHASES AND STORES.—W. J. Farrell, 30 Vesey street, New York.
DIVISION I.—SAFETY SECTION. — J. C. Caviston, 30 Vesey street, New York.
DIVISION VIII.—CAR SERVICE DIVISION.—C. A. Buch, Seventeenth and H streets, Washington, D. C.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, 11402 Calumet avenue, Chicago.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. Thirty-ninth street, New York.
RAILROAD DIVISION.—Paul D. Mallay, chief engineer, transportation department, Johns-Manville Corporation, 292 Madison avenue, New York.
MACHINE SHOP PRACTICE DIVISION.—Carlos de Zafra, care of A. S. M. E., 29 West Thirty-ninth street, New York.
MATERIALS HANDLING DIVISION.—M. W. Potts, Alvey-Ferguson Company, 1440 Broadway, New York.
OIL AND GAS POWER DIVISION.—L. H. Morrison, associate editor, Power, 475 Tenth avenue, New York.
FUELS DIVISION.—A. D. Black, associate editor, Power, 475 Tenth avenue, New York.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 7016 Euclid avenue, Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce street, Philadelphia, Pa.

AMERICAN WELDING SOCIETY.—Miss M. M. Kelly, 29 West Thirty-ninth street, New York.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Joseph A. Andrucetti, C. & N. W., Room 411, C. & N. W. Station, Chicago, Ill.

ASSOCIATION OF RAILWAY SUPPLY MEN.—J. W. Fogg, MacLean-Fogg Lock Nut Company, 2649 N. Kildar avenue, Chicago. Meets with International Railway General Foremen's Association.

BOILER MAKER'S SUPPLY MEN'S ASSOCIATION.—Frank C. Hasse, Oxweld Railroad Service Company, 230 N. Michigan avenue, Chicago. Meets with Master Boiler Makers' Association.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2276 Wikon avenue, Montreal, Que. Regular meetings, second Monday of each month except in June, July and August, at Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS ASSOCIATION.—A. S. Sternberg, master car builder, Belt Railway of Chicago.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 3001 West Thirty-ninth Place, Chicago, Ill. Regular meeting, second Monday in each month, except June, July and August. Great Northern Hotel, Chicago, Ill.

CAR FOREMEN'S CLUB OF LOS ANGELES.—J. W. Krause, 608 South Main street, Los Angeles, Cal. Meetings second Monday of each month except July, August and September, in the Pacific Electric Club building, Los Angeles, Cal.

CAR FOREMAN'S ASSOCIATION OF OMAHA, Council Bluffs and South Omaha Interchange.—Geo. Kriegler, car foreman, Chicago, Burlington & Quincy, Sixteenth avenue and Sixth streets, Council Bluffs, Iowa. Regular meetings, second Thursday of each month at Council Bluffs.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—F. G. Weigman, 720 North Twenty-third street, East St. Louis, Ill. Regular meeting first Tuesday in each month, except July and August, at American Hotel Annex, St. Louis, Mo.

CENTRAL RAILWAY CLUB OF BUFFALO.—T. J. O'Donnell, 1004 Prudential building, Buffalo, N. Y. Regular meeting, second Thursday each month, except June, July and August, at Hotel Statler, Buffalo.

CINCINNATI RAILWAY CLUB.—D. R. Boyd, 453 East Sixth Street, Cincinnati. Regular meeting second Tuesday, February, May, September and November.

CLEVELAND RAILWAY CLUB.—F. L. Frericks, 14416 Adler avenue, Cleveland, Ohio. Meeting first Monday each month, except July, August and September, at Hotel Hollanden, East Sixth and Superior avenue.

EASTERN CAR FOREMEN'S ASSOCIATION.—E. L. Brown, care of the Baltimore & Ohio, Staten Island, N. Y. Regular meetings fourth Friday of each month, except June, July, August and September.

INTERNATIONAL RAILROAD MASTER BLACKSMITH'S ASSOCIATION.—W. J. Mayer, Michigan Central, 2347 Clark avenue, Detroit, Mich.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—J. H. Jones, Crucible Steel Company of America, 650 Washington boulevard, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. T. Winkless, Room 707, LaSalle Street Station, Chicago. Next meeting May 5-8, 1931, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S Association.—William Hall, 1061 W. Wabasha street, Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—W. J. Dickinson, acting secretary, 1703 Fisher building, Chicago. Meets with International Railway Fuel Association.

LOUISIANA CAR DEPARTMENT ASSOCIATION.—L. Brownlee, 3730 South Prieur street, New Orleans, La. Meetings third Thursday in each month.

MASTER BOILERMAKER'S ASSOCIATION. — A. F. Stiglmeier, secretary, 29 Parkwood street, Albany, N. Y.

MASTER CAR BUILDERS' AND SUPERVISORS' ASSOCIATION.—See Car Department Officers Association.

NATIONAL SAFETY COUNCIL—STEAM RAILROAD SECTION: W. A. Booth, Canadian National, Montreal, Que. William Penn and Fort Pitt Hotels, Pittsburgh, Pa.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic avenue, Boston, Mass. Regular meeting second Tuesday in each month, excepting June, July, August and September. Copley-Plaza Hotel, Boston.

NEW YORK RAILROAD CLUB.—Meetings third Friday in each month, except June, July and August, at 29 West Thirty-ninth street, New York. Douglas I. McKay, executive secretary, 26 Cortlandt street, New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month in San Francisco and Oakland, Cal., alternately.

PUEBLO CAR MEN'S ASSOCIATION.—I. F. Wharton, chief clerk, Interchange Bureau, Pueblo, Colo.

RAILWAY BUSINESS ASSOCIATION. — Frank W. Noxon, 1124 Woodward building, Washington, D. C.

RAILWAY CAR MEN'S CLUB OF PEORIA AND PEKIN.—C. L. Roberts, chief clerk, Peoria & Pekin Union Railway, 217 Lydia avenue, Peoria, Ill.

RAILWAY CLUB OF GREENVILLE.—Paul A. Minnis, Bessemer & Lake Erie, Greenville, Pa. Meetings third Tuesday of each month, except June, July and August.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Regular meeting fourth Thursday in month, except June, July and August. Ft. Pitt Hotel, Pittsburgh, Pa.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—F. W. Venton, Crane Company, 836 South Michigan avenue, Chicago. Meets with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio, Baltimore, Md. Next meeting, October 21-23.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, American Railway Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, M. P. O., Drawer 24, St. Louis, Mo. Regular meetings, second Friday in each month, except June, July and August.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings third Thursday in January, March, May, June, September and November. Annual meeting third Thursday in November, Ansley Hotel, Atlanta, Ga.

SUPPLY MEN'S ASSOCIATION.—E. H. Hancock, treasurer, Louisville Varnish Company, Louisville, Ky. Meets with Equipment Painting Section, Mechanical Division, American Railway Association.

SUPPLY MEN'S ASSOCIATION.—Bradley S. Johnson, W. H. Miner, Inc., Chicago. Meets with Master Car Builders and Supervisors' Association.

TRAVELING ENGINEERS' ASSOCIATION. — W. O. Thompson, 1177 East Ninety-eighth street, Cleveland, Ohio.

WESTERN RAILWAY CLUB.—W. J. Dickinson, 343 South Dearborn street, Chicago. Regular meetings, third Monday in each month, except June, July and August.

NEWS

THE CHICAGO, ROCK ISLAND & PACIFIC has installed four of the latest type parlor cars on its passenger trains between Chicago and Peoria. These cars are decorated in grey-green, have a capacity for seating 22 persons in the main room.

THE WABASH has awarded a contract to Jerome A. Moss, Inc., Chicago, for the construction of an addition to the roundhouse at Decatur, Ill., and a wash and locker building at the same point, involving a total expenditure of $100,000.

THE CHICAGO, BURLINGTON & QUINCY on August 19 replaced the last of its wooden coaches in Chicago suburban service with steel cars. The program of replacing wooden cars with steel cars was started several years ago, and at the present time only a few wooden coaches are still used on the system.

THE CANADIAN PACIFIC has awarded a contract to Anglin-Norcross, Ltd., Toronto, Ont., for the construction of a number of buildings and other structures at Toronto at a cost of approximately $500,000. These include a storehouse, a yard office, a repair shop, a linen storage building, truck platforms, two standpipes, a bunkhouse and an addition to the enginehouse.

Wage Statistics

THE NUMBER of employees reported by class I railroads to the Interstate Commerce Commission as of the middle of June was 1,564,277 and the total compensation was $218,044,256. Compared with returns for the corresponding month of last year, this shows a decrease of 171,919, or 9.9 per cent, in the number of employees and a decrease of $27,720,954, or 11.28 per cent, in the compensation.

Machine-Age Developments

THE MUSEUM OF PEACEFUL ARTS, 220 East Forty-Second street, New York, recently opened with a machine-age exhibit which portrays the developments made in machine design over a period of 150 years. The exhibit entitled "Men and Machines" is a graphic portrayal of man's progress in the developments of machine civilization. Through the use of models, machines and graphic devices, it shows the sequence of scientific discoveries, inventions, and machine improvements which have transformed industry and society during the past century and a half. Models of early and modern locomotives, telephones, textile and agricultural machinery, presses and printing accessories, sewing machines, bicycles, automobiles, airplanes, and radio apparatus, are shown. Watt's steam engine, modern steam engines, internal combustion engines, electric current transmission, development of the central power station, water-power development, and many other interesting exhibits are also included in the new museum which is located in the heart of New York City.

The design and assembling of the exhibit was under the supervision of the technical and educational committees of the museum which include F. C. Brown, director of the museums; Professor Charles R. Richards, vice-president; Professor Joseph W. Roe, professor of industrial engineering at New York University; Calvin W. Rice, secretary of the American Society of Mechanical Engineers and of the museums; L. A. Alford, president of the Ronald Press, and Professor Robert H. Smith, associate professor of machine construction at Massachusetts Institute of Technology, Boston, Mass.

Katy Renews Firebox in 64 Working Hours

WITHOUT ANY particular advance preparation or assembly of material, the Missouri-Kansas-Texas recently took a Mikado-type locomotive, No. 919, with a tractive effort of 63,900 lb., into its Bellmead shop, Waco, Tex., for Class II repairs, which includes a new firebox and general repairs to machinery. At the end of 64 shop working hours, this locomotive left the shop ready for a "break-in" trip. The progress of the various repair operations was as follows:

	Hrs.
Locomotive stripped and flues removed	8
Locomotive lifted from wheels and placed on blocks	11
Old firebox completely removed	16
Boiler sand-blasted and scale removed	20
Backhead braces repaired	21¾
New firebox in place, door sheet and flue sheet riveted, rivet holes in mud ring reamed and two small patches applied to third boiler course	26
Mud ring riveted and seams caulked, radial stays, staybolts, belly braces and flues applied and boiler ready for test	48
Hydrostatic test completed	51½
Locomotive wheeled	52
Lagging, jacket, running boards, cap and all appurtenances applied; valves set, locomotive coupled to tender, boiler fired and safety valve set ready for "break-in" trip	64

The only material provided in advance was the firebox sheets, placed in the shop so that work could be started on the box and the locomotive at the same time. There was a lapse of 21 hours from the time the locomotive entered the shop until the firebox was in place which was ample time for construction of the firebox.

In addition to the above repairs, this locomotive received the initial application of a power reverse gear and a brakeman's cupola on the tender. The Franklin trailer booster, with which the locomotive was equipped, was also given complete repairs.

Domestic Orders Reported During September, 1930

Locomotives

Name of Company	No. Locos. ordered	Type	Builder
Lehigh & New England	2	2-10-0	Baldwin Locomotive Works
	3	Switching	Baldwin Locomotive Works
N. Y. N. H. & H.	10	Electric	General Electric Co.
Norfolk & Western	10	Mallet	Company shops
Total for month	25		

Freight Cars

Name of Company	No. cars ordered	Type	Builder
Mather Stock Car Co.	200	Stock	Company shops
Lehigh & New England	300	Box	Magor Car Corp.
	5	Caboose	Magor Car Corp.
Illinois Steel Co.	10	Roll transfer	Lorain Steel Co.
Tennessee Copper Co.	50	Tank	General American Tank Car Corp.
Total for month	565		

Passenger Cars

Name of Company	No. cars ordered	Type	Builder
New York Central	50	Milk cars	Merchants Despatch Trans. Co.
Chicago, Burlington & Quincy	10	Baggage	Company shops
Erie	2	Mail and baggage	Bethlehem Steel Company
Total for month	62		

R. V. Wright Elected President, A.S.M.E.

ROY V. WRIGHT, editor of the *Railway Mechanical Engineer* and managing editor of the Railway Age, has been elected president of the American Society of Mechanical Engineers for 1931 by letter ballot of the members of the society.

Other elections announced by the tellers on September 23, 1930, were as follows: Vice-presidents — William A. Hanley, chief engineer, Eli Lilly Company, Indianapolis, Ind.; Thomas R. Weymouth, president, Oklahoma Natural Gas Corporation, Tulsa, Okla., and Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J. Managers—W. L. Batt, president, S.K.F. Industries, Inc., New York; H. L. Doolittle, chief designing engineer, Southern California Edison Company, Los Angeles, Cal.; and H. L. Whittemore, chief, Engineering

Mechanics Section, Bureau of Standards, Washington, D. C.

Mr. Wright has been active in the work of the American Society of Mechanical Engineers for many years. He was a member of the Railroad Committee, which was the predecessor of the present Railroad Division, and was a member of the first Metropolitan Section Committee. From 1921 to 1923, inclusive, he served as chairman of the Meetings and Program Committee, and is at present a member of the Committee of Awards and the Biography Advisory Committee.

He served a three-year term as manager, 1924 to 1926, inclusive, and was afterwards elected to serve a two-year term as vice-president, during 1927 and 1928. He served as president of the United Engineering Societies, 1928-1929.

Mr. Wright was one of the honorary editors of the Fifty-Year Progress Reports which were published by the A.S.M.E. in connection with its recent semi-annual celebration. He is the author of the section on Transportation in the book "Toward Civilization," a companion volume to "Whither Mankind."

Frisco Locomotive Kept in Service 740 Hours

THE ST. LOUIS-SAN FRANCISCO, which conducted a test in August, 1929, of Locomotive 4113 for 7,350 miles under continuous fire, has this year made a similar test with Locomotive 4213 which was kept in service during the entire month of August and accumulated a total of 9,700 miles, or 2,350 miles more than was run in the test last year. Crews were changed 79 times, the locomotive being operated in regular freight service between Kansas City, Mo., and Birmingham, Ala.

Locomotive 4213 was fired up at Kansas City, Mo., at 2 p. m. August 1, 1930. The fire was knocked at 10 a. m. September 1, 1930, after 31 days of continuous service, or 740 hours actual time under fire. The average length of time occupied in cleaning the fire at terminals and intermediate points was 25 min.

On arrival of this engine at Kansas City on September 1, the fire was knocked and the engine inspected. There were found four inches of cinders on the brick arch, a small amount in the combustion chamber and one bushel in the front end. The brick arch was thin but in good condition. The grates were in perfect condition. No renewals were necessary. The engine is equipped with a Type E superheater, having 201 3½-in. flues and 66 2¼-in. tubes. Of this number, 55 3½-in. flues and one 2¼-in. tube were stopped up.

On the last trip into Kansas City, the engine handled 5,023 tons, a total of 121 cars. The firebox was found to be in perfect condition; there was no sign of staybolts or flues leaking; and the boiler had no accumulation of mud or scale, except for about four inches of soft, slimy mud in the back water leg, which was easily removed with a stream of water.

An examination of the valves and cylinders showed the valves and rings to be in good condition, with 3/64-in wear on piston heads. No carbon was found in the valves or cylinders; the lubrication was good; and no rod bushings were renewed.

The locomotive is equipped with a modern-type booster, which was used in this test a total of 9 hr. 40 min, in starting trains and on ruling grades. The locomotive is equipped with a modern feed-water heater which was found to be free of scale, and the temperature reading at boiler check showed about the same on the last trip as on the first. The heater and pump supplied the boiler at all times.

General Test Data Secured on Endurance Run with Frisco Locomotive 4213

Total crews handling engine	80
Total subdivisions over which operated	80
Average train	2,696 tons
Total gross ton-miles	25,271,415
Total tons of coal used	1,023½
Lb. coal per 1,000 g.t.m.....	81
Total gal. of water used	1,479,628
Total time on the road	460 hr. 12 min.
Total delays on the road	88 hr. 45 min.
Time in motion	371 hr. 21 min.
Average speed betwen terminals	21 m.p.h.
Average speed in motion	26.1 m.p.h.

* * *

Frisco locomotive 4213 used in 31-day endurance run, under direct supervision of D. L. Forsythe, general road foreman of equipment (shown at right in the illustration)

The locomotive is equipped with a modern force-feed lubricator, supplying valves, cylinders, guides and two air compressors. It has a modern stoker, syphons and multiple throttle, and Alemite lubrication is used on this engine. The locomotive is also equipped with an engineman's control gage and superheater pyrometer. The average superheat temperature was 700 deg. F., the maximum noted being 745 deg. F. The average feedwater temperature was 210 deg. F.; maximum 240 deg. F.

The fuel consumption, including that used in preparing engines at initial terminals and conditioning fire at intermediate terminals, was 81 lb. per 1,000 gross ton-miles, as indicated in the table which gives other interesting test data.

Trade Publications

Copies of trade publications described in the column can be obtained by writing to the manufacturers. State the name and number of the bulletin or catalog desired, when mentioned in the description.

EXPANSION BORING TOOLS.—A new catalog illustrating and describing the complete line of Davis expansion boring tools and reamers has recently been published by the Davis Boring Tool Company of St. Louis, Mo.

ARMCO IRON PLATES—The American Rolling Mill Company, Middletown, Ohio, has recently published a four-page bulletin covering iron plate specifications. It contains complete A.S.T.M. specifications for open-hearth iron plates.

POWER PUNCH PRESS. — Dimensions and sizes of various types of Ambold power punch presses are given in the eight-page illustrated bulletin which has been prepared by the Ambold Machine Tool Corporation, 50 Church street, New York.

BRONZE VALVES.—Jenkins Bros., 80 White street, New York, recently issued a small pamphlet describing the Jenkins standard bronze valve for 150 lb. steam working pressure or 250 lb. oil, water and gas working pressure. Included in the pamphlet is a complete description of the valve together with a mention of its diverse uses.

BERWICK ELECTRIC METAL HEATERS.—A few of the many types of forging heaters that have been built by the American Car & Foundry Company, 30 Church street, New York, are shown in a four-page circular which the company has recently issued. A schedule shows the number of heats per hour per electrode for the type D and E heaters.

COPPUS LOCOBLOW.—A seven-page pamphlet, bulletin LB-3, issued by the Coppus Locomotive Equipment Company, Worcester, Mass., contains a complete description of the Coppus Locoblow and describes its application and operation. The pamphlet also contains a comparative performance table showing the relative costs of steaming a locomotive by the Locoblow method and by the old type steam blower.

Supply Trade Notes

A. H. SCHAFFERT, works manager of the Truscon Steel Company, Youngstown, Ohio, has been elected vice-president.

W. J. WALSH, formerly vice-president of the Galena Signal Oil Company, with headquarters at Chicago, has been elected vice-president and general manager of the Continuous Rail Crossing Corporation, with headquarters at Chicago. Mr. Walsh entered railway service in 1886 as an apprentice in the shops of the Cleveland, Cincinnati, Chicago & St. Louis at Cleveland, Ohio. In 1889 he was made a machinist on the Cincinnati, New Orleans & Texas

W. J. Walsh

Pacific, and during the period to 1891 was a locomotive engineman, a general foreman and mechanical instructor on the first air-brake car ever constructed. In the latter year he was promoted to division master mechanic, which position he held until 1896 when he resigned to become lubrication engineer with the Galena Signal Oil Company, at Chicago. In 1910 he was promoted to manager of the Chicago district, and on February 4, 1920, was elected vice-president, which position he held until his resignation on January 1, 1928. During the past two years, he has acted in a consulting capacity on problems of lubrication for various railroads and industries.

TUBE-TURNS, INC., Louisville, Ky., manufacturers of seamless short-radius forged fittings for pipe welding, has appointed the following distributors: The Grinell Company, Charlotte, N. C., for North and South Carolina and Georgia; the Ebbert & Kirkman Company, Inc., Birmingham, Ala., for Alabama; the B. Hoffmann Manufacturing Company, Milwaukee, Wis., for Milwaukee and adjacent territory; the United Pipe & Supply Company, Charleston, W. Va., for Charleston and adjacent territory; the Vulcan Copper & Supply Company, Cincinnati, Ohio, for Cincinnati and adjacent territory, and Hedley & Voisinet, Buffalo, N. Y., for Buffalo and surrounding territory.

THE PRESSED STEEL CAR COMPANY, Chicago, is adding an additional power unit and planning additions to its steel foundries at Hegewisch, Ill.

HARRY T. GILBERT, vice-president in charge of sales of the Republic Steel Corporation, has been appointed assistant to the president, with headquarters at Youngstown, Ohio, and has been succeeded by Norris J. Clark, vice-president and chairman of the executive committee of the Lamson & Sessions Company, Cleveland, Ohio.

AMBROSE N. DIEHL, who has been elected a vice-president of the United States Steel Corporation, with headquarters at New York, was born in York county, Pa., on October 20, 1876. After attending the public schools he was graduated from York Collegiate Institute, York, Pa., in 1894, later receiving from the Pennsylvania State College, the degree of B. S. in 1898. He has been connected with the steel business since 1899, serving in various positions. In 1918 he was appointed general superintendent of the Duquesne works of the

Ambrose N. Diehl

Carnegie Steel Company and since January, 1925, he has been a vice-president of that company; Mr. Diehl now becomes a vice-president of the United States Steel Corporation.

JAMES W. OWENS, formerly welding aide for the Bureau of Construction and Repair of the U. S. Navy, has resigned as director of welding at the Newport News Shipyard to become director of engineering and secretary of the Welding Engineering & Research Corporation, New York, of which, through a recent reorganization, Prof. Comfort A. Adams has become president; J. H. Deppeler, vice-president, and C. A. McCune, director of research and treasurer. Professor Adams was first president of the American Welding Society and during the World War was chairman of the General Engineering Committee of the Council of International Defense. Mr. Deppeler was president of the American Welding Society from 1920 to 1921.

THE INLAND STEEL COMPANY is reclaiming 50 acres from Lake Michigan for the future expansion of its Indiana Harbor, Ind., plant.

FREDERICK M. KREINER, treasurer of Manning, Maxwell & Moore, Inc., New York, has been elected a vice-president. Mr. Kreiner will continue also as treasurer.

H. R. ROWLAND, division manager at Philadelphia, Pa., of the A. M. Byers Company, Pittsburgh, Pa., has been transferred to Pittsburgh as division manager and E. L. MacWhorter, representing the company in western New York, has been promoted to division manager at Philadelphia. A national sales meeting will be held in Pittsburgh early in October in conjunction with the official opening of the company's new $12,000,000 plant.

FRANK PARKER has resigned as vice-president of Briggs & Turivas, Blue Island, Ill., and has organized Iron & Steel Products, Inc., with offices in the Railway Exchange building, Chicago, to do a general trading business in iron and steel products, railway car parts and equipment. Mr. Parker was born in Chicago in 1890. At the age of 15 he entered the employ of the Republic Iron & Steel Company, now the Republic Steel Corporation, in the purchasing department at Chicago. In 1909, after the general offices were moved to Pittsburgh, he was placed in charge of the Chicago branch purchasing department. In 1911, when the operating and purchasing departments were merged and moved to Youngstown, Mr. Parker was promoted

Frank Parker

to assistant general superintendent. He remained in that capacity until December 31, 1916, when he resigned to become general manager of Briggs & Turivas, Inc. In 1928 he was promoted to vice-president and general manager, which position he held until his recent resignation. In 1927 Mr. Parker was elected president of the Railway Car & Equipment Corporation, East Chicago, Ind., a subsidiary of Briggs & Turivas, Inc., which repairs and rebuilds freight cars and which also operates a private tank car line, and will continue as president of the subsidiary. Mr. Parker is president of the Chicago Chapter of the Institute of Scrap Iron & Steel, Inc., and vice-president of the national association.

J. LAMONT HUGHES, the new president of the Carnegie Steel Company, has been identified with the industry for the past 33 years. He was born at Mercer, Pa., in January, 1878, and attended the common schools, later graduating from North Braddock, Pa., high school. He began work in the engineering department of the Edgar Thomson works of the Carnegie Steel Company in September, 1897. He took charge of engineering for the Union Steel Company, now part of the American Steel & Wire Company in June, 1901, and went to Youngstown in January, 1905, as master mechanic of the bar mills of the Youngstown district of the Carnegie Steel Company. He was appointed assistant general superintendent of the bar mills of the Youngstown district of the Carnegie Steel Company in March, 1906, and five years later became general superintendent of these mills. In January, 1916, he was appointed assistant general superintendent of the entire Youngstown district of the Carnegie Steel Company. He subsequently served as general superintendent in charge of the Canadian Steel Company's

J. Lamont Hughes

project at Ojibway, Ontario, and was transferred in June, 1918, to the Neville Island gun plant at Neville Island, Pa., as general superintendent of the operations being carried out by the United States Steel Corporation for the government. Mr. Hughes became president in May, 1919, of the Lorain Steel Company, a subsidiary of the United States Steel Corporation, returning to the Carnegie Steel Company, Youngstown, as general superintendent in January, 1920. Five years later he became vice-president of the Carnegie Steel Company and since April, 1928, has served as a vice-president of the United States Steel Corporation.

WILLIAM G. CLYDE, who resigned as president of the Carnegie Steel Company on account of ill health, effective September 1, was born at Chester, Pa., and attended the public schools of Chester, later graduating in the class of 1888 from the Pennsylvania Military College. He began work as a civil engineer with Ryan & McDonald, constructors, Baltimore, Md., and later became associated with Robert Wetherall & Company, machinists and founders of Chester. Mr. Clyde began his mill training with the Wellman Steel & Iron Company, Thurlow, Pa., as superintendent of the plate mills. He subsequently went to the Illinois Steel Company at South Chicago where he remained for six years. He then was appointed sales manager of the American Steel Hoop Company at Phil-

William G. Clyde

adelphia, remaining in that position until that company was taken over by the Carnegie Steel Company. After serving for three years in sales work at the Cleveland offices, Mr. Clyde was appointed assistant general sales manager of the Carnegie Steel Company, with headquarters at Pittsburgh and from March, 1918, he served as vice-president, general manager of sales and a director until his election as president of the same company in November, 1925.

THE LANDIS MACHINE COMPANY OF CANADA, LTD., Welland, Ont., has changed its name to the Canadian Landis Machine Company, Ltd. J. N. Stickell is superintendent of the company and C. H. Gilland is special sales representative.

ROBERT P. PECKETT, JR., vice-president of The J. S. Coffin, Jr., Company, Englewood, N. J., has assumed charge of sales in the northeastern territory, being relieved of all duties incident to the service department. Charles W. Wheeler has been appointed service manager, with full jurisdiction over the service department and matters relating thereto, succeeding Mr. Peckett, Jr., and T. C. Browne has been appointed publicity manager, having charge of matters relating to advertising and general publicity work; all with headquarters at Englewood, N. J.

L. C. HENSEL, formerly railroad sales manager of the Gould Storage Battery Company, has been appointed vice-president of Utilities Accessories, Inc., New York. Utilities Accessories, Inc., of which Charles J. Gale is president and treasurer and Lewis Karasik secretary, was formed for the purpose of selling railroad and public utility supplies and accessories, but is now concentrating on the promotion and sale of Rust-oy, a special rust preventative. Mr. Hensel is in charge of the sales and engineering activities of the company. John W. O'Connor and Frank J. Houghtalin have been appointed special representatives in the eastern district.

Personal Mention

Master Mechanics and Road Foremen

A. H. BIERNE, master mechanic of the New Mexico division of the Atchison, Topeka & Santa Fe, has had his headquarters transferred from Raton, N. M., to Albuquerque, N. M.

DONALD M. SMITH, division master mechanic on the Alberta district of the Canadian Pacific at Medicine Hat, Alta., has been transferred to Edmonton, Alta., succeeding J. W. Jackson, who has been transferred to Medicine Hat.

W. H. GILMAN, master mechanic of the Santa Fe Northwestern and the Santa Fe, San Juan & Northern, has been elected vice-president in charge of operations of those railroads, with headquarters as before at Bernalillo, N. M.

J. A. MARSHALL, master mechanic of the Idaho division of the Northern Pacific, at Parkwater, Wash., has been transferred to the Rocky Mountain division with headquarters at Missoula, Mont., succeeding G. L. Ernstrom.

W. A. KELLY, assistant master mechanic on the Chicago, Burlington & Quincy at Ottumwa, Ia., retired from active duty on September 1, after 50 years of service, and the position of assistant master mechanic at Ottumwa has been abolished.

J. P. MCMURRAY, master mechanic of the Rio Grande division of the Atchison Topeka & Santa Fe, which has been consolidated with the New Mexico division, has been appointed assistant master mechanic of the latter division, with headquarters at El Paso, Tex.

G. F. EGBERS, general master mechanic of the Northern Pacific, lines east of Helena, Mont., and Butte, with headquarters at Livingston, Mont., has been appointed master mechanic of the Idaho division, with headquarters at Parkwater, Wash.

GEORGE L. ERNSTROM, master mechanic of the Rocky Mountain division of the Northern Pacific at Missoula, Mont., has been promoted to the position of general master mechanic of the lines east of Helena, Mont., and Butte, with headquarters at St. Paul, Minn.

WEBSTER E. HARMISON, who has been appointed district master mechanic of the Erie, with headquarters at Secaucus, N. J., was born on May 13, 1883, at Galion, Ohio. He attended high school for one year and in December, 1898, entered the employ of the Erie as a call boy. He became a machinist apprentice in September, 1900, and upon the completion of his apprenticeship in September, 1904, worked for several railroads as a machinist. For four years he was enginehouse foreman and general foreman of the Chicago, Rock Island & Pacific and for three years was enginehouse foreman of the Minne-

apolis & St. Louis. He returned to the Erie in August, 1916, as enginehouse foreman at Kent, Ohio. In December, 1916, he was appointed general foreman; on March 31, 1918, appointed general inspector, Lines West; on July 1, 1918, promoted to the position of assistant master mechanic at Brier Hill; on July 21, 1918, appointed master mechanic at Kent; on June 1, 1927, appointed master mechanic at Port Jervis, N. Y., and on January 1, 1928, appointed master mechanic at Meadville, Pa., being transferred to the New York district on August 1 of this year.

Car Department

J W. DOWNS has been appointed coach foreman of the Illinois Central, with headquarters at Louisville, Ky.

JOSEPH GUTTERIDGE, general car foreman of the Kansas City Southern at Pittsburg, Kan., has been promoted to the position of master car builder, with headquarters at Pittsburg, succeeding E. H. Weigman, who resigned recently to enter the railway supply field. Mr. Gutteridge entered railway service as an engine wiper in the employ of the Kansas City Southern at Pittsburg on August 11, 1897, and his entire railroad career has been with that company. A year after his entry into railway service he was promoted to locomotive fireman, returning to the mechanical department on February 2, 1899. Later in the same year Mr. Gutteridge became a car repairer and in March, 1900, was promoted to rip track foreman. From March 1, 1907, to March 1, 1910, he served as chief clerk to the general car foreman and on the latter date was advanced to the position of general car foreman at Pittsburg.

Joseph Gutteridge

R. R. CHAPPELL, general foreman in the car department of the Wabash at Fort Wayne, Ind., has been promoted to car shop superintendent, with headquarters at Decatur, Ill., succeeding C. W. Graham.

C. W. GRAHAM, car shop superintendent of the Wabash at Decatur, Ill., has been appointed general foreman in the car department at Fort Wayne, Ind.

JOHN C. TESSMER, car foreman of the Kansas City Southern at Heavener, Okla., has been appointed rip track foreman, with headquarters at Kansas City, Mo., succeeding C. E. Weaver.

CHARLES E. WEAVER, repair track foreman of the Kansas City Southern at Kansas City, Mo., has been promoted to the position of general car foreman at Pittsburg, succeeding Joseph Gutteridge.

JOHN H. MATTHEWS, coach foreman of the Illinois Central at Louisville, Ky., has been promoted to the position of car foreman, with headquarters at Louisville.

Shops and Enginehouse

R. E. CLEMINSON, locomotive foreman of the Canadian Pacific at Farnham, Que., has been appointed locomotive foreman, with headquarters at Chapleau, Ont.

OSCAR REBER, enginehouse foreman of the Illinois Central at Princeton, Ky., has been promoted to the position of general foreman, mechanical department, with headquarters at Louisville, Ky.

W. J. KANEWSKE, day enginehouse foreman of the Kansas City Southern at Shreveport, La., has been appointed general enginehouse foreman, with headquarters at Heavener, Okla., succeeding O. R. Diamond.

O. R. DIAMOND, general enginehouse foreman of the Kansas City Southern at Heavener, Okla., has been appointed general enginehouse foreman, with headquarters at Kansas City, Mo., succeeding J. E. Burke, retired.

Obituary

M. A. HALL, superintendent of machinery of the Kansas City Southern, with headquarters at Pittsburg, Kan., was killed at Merwin, Mo., on September 7 in an accident which occurred while he was supervising wrecking operations following a passenger train derailment.

M. A. Hall

Mr. Hall had been connected with the Kansas City Southern for more than 25 years. He was born at Otterville, Mo., on August 7, 1884, and served his mechanical apprenticeship on the Atchison, Topeka & Santa Fe. He entered the service of the Kansas City Southern on March 25, 1905, as a machinist at Pittsburg, two years later being promoted to erecting foreman. After occupying a number of other positions in the shops at Pittsburg, he was advanced to the position of shop superintendent at that point on October 1, 1913. He was promoted to master mechanic at Shreveport, La., on January 16, 1917, and two years later was transferred to Pittsburg. Mr. Hall had been superintendent of machinery of the Kansas City Southern since June 1, 1920.

EDMOND D. BRONNER, vice-president of the Michigan Central, with headquarters at Detroit, Mich., since 1917, and

Edmond D. Bronner

during government control of the railways federal manager of that road, died at his home in that city on September 1 after an illness of three months. Mr. Bronner, who served as the executive head of the Michigan Central at Detroit, had been connected with the road for more than 50 years. He was born at Buffalo, N. Y., on February 15, 1859, and was a graduate of the United States Naval Academy. In July, 1880, he entered railway service as a draftsman in the car department of the Canada Southern (now a part of the Michigan Central). Later he was transferred to the West Detroit car shops of the Michigan Central and in 1885 he was advanced to assistant general foreman of those shops. Mr. Bronner continued his service in the mechanical department being promoted to general foreman of shops in 1886, to master car builder in 1890, to assistant superintendent of motive power and equipment in 1896 and to superintendent of motive power and equipment in 1900. In 1912 he was further promoted to general manager of the Michigan Central, then being elected vice-president and general manager in 1917. From June 10, 1918, to March 1, 1920, he served as federal manager of the Michigan Central and on the later date he resumed his position as vice-president, though at that time he relinquished his duties as general manager. During practically his entire service with the Michigan Central Mr. Bronner's headquarters have been located in Detroit or its immediate vicinity.